Initial Study and Proposed Mitigated Negative Declaration

For

Royal Gold Soil Operation

California Environmental Quality Act (CEQA)

May 17, 2022

Lead Agency:
Humboldt County
3015 H St.
Eureka, CA 95501

Lead Agency Contact:
Steve Lazar, Senior Planner
707-268-3741
SLazar@co.humboldt.ca.us

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List of Acronyms

Measurement Terms

gpd	gallons per day
kWh	kilowatt-hour
mg\kg	milligrams per kilogram
mg/L	milligrams per liter
µg/L	micrograms per liter
m.p.h.	miles per hour
ppm	parts per million
sf	square feet

Additional Terms

AB	Assembly Bill
ACOE	Army Corps of Engineers
ADA	Americans with Disabilities Act
Al	Aluminum
AFV	Alternative Fuel Vehicles
APN	Assessor's Parcel Number
APSA	Aboveground Petroleum Storage Act
BACT	Best Available Control Technology
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BIOS	Biogeographical Information and Observation System
BLFPD	Blue Lake Fire Protection District
BLRTS	Blue Lake Rancheria Transit System
BMP	Best Management Practice
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalARP	California Accidental Release Prevention
CA DOF	California Department of Finance
CAFE	Corporate Average Fuel Economy
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
CalOES	California Office of Emergency Services
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CBC	California Building Code
CCE	Community Choice Energy
CCR	California Code of Regulations
CDC	California Department of Conservation

CDFW	California Department of Fish & Wildlife
CalRecycle	California Department of Resources, Recycling, and Recovery
CDWR	California Department of Water Resources
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERS	California Environmental Reporting System
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CGP	Construction General Permit
CGS	California Geological Survey
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations
CH4	Methane
CMC	Criterion Maximum Concentration
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CUP	Conditional Use Permit
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan
dB	Decibels
dBA	A-weighted Decibels
DOC	Dissolved Organic Carbon
DOORS	Diesel Off-Road Online Reporting System
DOT	U.S. Department of Transportation
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
EPAct	Energy Policy Act
ERA	Exceedance Response Action
EV	Electric Vehicles
Fe	Iron
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FGCSD	Fieldbrook-Glendale Community Services District
FHSZ	Fire Hazard Severity Zone
FIRM	Flood Insurance Rate Map
GHG	Greenhouse Gases
GIS	Geographic Information System

HAP	Hazardous Air Pollutants
HBGS	Humboldt Bay Generating Station
HBMWD	Humboldt Bay Municipal Water District
HC	Hydrocarbon
HCAOG	Humboldt County Association of Governments
HCDEH	Humboldt County Division of Environmental Health
HCP	Habitat Conservation Plan
HFC	Hydrofluorocarbons
IDA	International Dark-Sky Association
IG	Industrial General
IGP	Industrial General Permit
IPaC	Information for Planning and Conservation
IS	Initial Study
ITE	Institute of Transportation Engineers
Ldn	Day-Night Average Sound Level
LEA	Local Enforcement Agency
LOS	Level of Service
LSA	Lake and Streambed Alteration
LSI	Large Spark Ignition
M&P	McNamara & Peepe
MBTA	Migratory Bird Treaty Act
MCAQMD	Mendocino Air Quality Management District
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MFPP	Master Fire Protection Plan
MND	Mitigated Negative Declaration
MSGP	Multi-Sector General Permit
MU	Mixed Use
N2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAL	Numeric Action Level
NAS	National Academies of Sciences, Engineering, and Medicine
NAVD	North American Vertical Datum
NCAB	North Coast Air Basin
NCCP	Natural Community Conservation Planning
NCRA	North Coast Railroad Authority
NCRWQCB	North Coast Regional Water Quality Control Board
NCUAQMD	North Coast Unified Air Quality Management District
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NMFS	National Marine Fisheries Service
NOA	Naturally Occurring Asbestos
NOx	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRC	National Research Council

NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSR	New Source Review
NWI	National Wetland Inventory
O_3	Ozone
O&G	Oil and Grease
OHWM	Ordinary High-Water Mark
OIMP	Odor Impact Minimization Plan
OPR	Governor's Office of Planning and Research
OSFM	Office of the State Fire Marshal
PCP	Pentachlorophenol
PEM1C	Palustrine Emergent, Persistent, Seasonally Flooded
PFC	Perfluorocarbons
PG&E	Pacific Gas & Electric Company
PHG	Public Health Goal
PM	Particulate Matter
PRC	Public Resources Code
PSC	Potential Site Contaminants
PSD	Prevention of Significant Deterioration
PSS1C	Palustrine Scrub-Shrub, Broadleaved Deciduous, Seasonally Flooded
QISP	Qualified Industrial Stormwater Practitioner
QSE	Qualifying Storm Event
RAP	Remedial Action Plan
RCEA	Redwood Coast Energy Authority
RL	Residential Low Density
ROG	Reactive Organic Gases
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SF6	Sulfur Hexafluoride
SGMP	Soil and Groundwater Management Plan
SIC	Standard Industrial Classification
SMA	Streamside Management Area
SMARTS	Stormwater Multiple Applications and Report Tracking System
SMAWO	Streamside Management Areas and Wetlands Ordinance
SO_2	Sulfur Dioxide
SP	Special Permit
SPCC	Spill Prevention, Control, and Countermeasure
SRA	State Responsibility Area
SSC	Species of Special Concern
SWAMP	Surface Water Ambient Monitoring Program
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TCP	Tetrachlorophenol
TEQ	Toxic Equivalent Quotient
THPO	Tribal Historic Preservation Officer

TP	Test Pit
TSS	Total Suspended Solids
U	Unclassified
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VegCAMP	Vegetation Classification and Mapping Program
VES	Visual Encounter Survey
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WDID	Waste Discharger Identification Number
WDR	Waste Discharge Requirement
WMMP	Wetland Mitigation and Monitoring Plan
WRA	William Rich & Associates
WSS	Web Soil Survey
ZN	Zinc

1. Project Summary

Date:	December 1, 2021
Project Title:	Royal Gold Soil Operation
Project Summary:	A Conditional Use permit (CUP), Special Permit (SP), and Lot Line Adjustment are being sought by the applicant (Royal Gold, LLC) to bring an existing unpermitted potting soil and fertilizer manufacturing business into compliance with local land use regulations. The business is operated from within an approximately 34-acre area spread across multiple parcels in the unincorporated community of Glendale.
Project Sponsor:	Royal Gold, LLC Chad Waters, Owner 600 F Street Suite 3, #603 Arcata, CA 95521 (707) 822-4653
Lead Agency:	Humboldt County
Lead Agency Contact:	Lead Agency Contact: Steve Lazar, Senior Planner (707) 268-3741 slazar@co.humboldt.ca.us 3015 H St. Eureka, CA 95501
Report Author:	Steve Lazar, Senior Planner, Humboldt County
Contributors:	Garry Rees, AICP, Senior Planner, SHN Consulting Engineers & Geologists Stein Coriell, AICP, Senior Planner, SHN Consulting Engineers & Geologists
Contributor Contact:	SHN Consulting Engineers & Geologists 1062 G Street, Suite I, Arcata, CA 95521 (707) 822-5785
Project Location:	Royal Gold, LLC 1689 Glendale Drive, Blue Lake, CA 95525 Latitude: 40.900625 Longitude: -124.020521

	The project site is located in the unincorporated community of Glendale, on the north side of Glendale Drive.
Coastal Zone:	The property is located outside of the Coastal Zone.
Affected Parcels:	Assessor's Parcel Numbers (APNs): 516-101-005, -008, -017, -040, -041, -060, -063, -064, -068, -079, -081, -083, -084 and 516-111-003, -062, and -063. Additionally, Royal Gold was using APN 516-111-064 for the storage of raw material (palletized, sealed, and covered), including peat and coco. Use of this property has ceased.
General Plan Designation:	Industrial General (IG), Mixed-Use (MU), and Residential Low Density (RL).
Zoning:	Unclassified (U).
Other Permits and Approvals required:	1) USACE – 404 Nationwide Permit 27 2) NCRWQCB – 401 Water Quality Certification 3) CDFW – Lake and Streambed Alteration Agreement 4) SWRCB – Construction General Permit and Industrial General Permit 5) CARB – Compliance with In-Use-Off-Road Diesel Vehicle Regulation using the Diesel Off-Road Online Reporting System, DOORS 6) NCUAQMD – Permits to Operate 7) HCDEH – Notification for Agricultural Material Composting Operation and Odor Impact Minimization Plan 8) CalEPA/HCDEH – Unified Program 9) DTSC – Authorization of use of areas subject to Land Use Covenant 10) FGCSD – Industrial Wastewater Discharge Permit 11) Humboldt County Building Division – Building/Grading Permits 12) Humboldt County Public Works Department – Encroachment Permit
Tribal Consultation:	As required by AB 52, Humboldt County sent requests for formal consultation on April 1, 2021 to the Tribal Historic Preservation Officers (THPOs) for the Wiyot Tribe, Blue Lake Rancheria, and the Bear River Band of the Rohnerville Rancheria. The Blue Lake Rancheria and the Wiyot Tribe THPOs responded and recommended that an inadvertent archaeological discovery protocol be made a project condition (Eidsness, 2021; Hernandez, 2021).

1.1. CEQA Requirements:

The proposed discretionary approvals (such as, Conditional Use Permit [CUP], Special Permit [SP]), and Lot Line Adjustment [LLA] to allow permitting of an existing soil and fertilizer manufacturing business conducted from within an approximately 34-acre area spread across multiple parcels in the Glendale area is a "project" subject to compliance with the requirements of the California Environmental Quality Act (CEQA). CEQA encourages lead agencies and applicants to modify their projects to avoid potentially significant adverse impacts (CEQA Section 20180 [C] [2] and State CEQA Guidelines Section 15070[b] [2]).

The Lead Agency for the proposed project is the County of Humboldt, per CEQA Guidelines Section 21067. Compliance with CEQA is being performed by the Humboldt County Planning & Building Department in tandem with processing of the Conditional Use Permit, Special Permit, and Lot Line Adjustment. The purpose of this Initial Study (IS) is to provide a basis for determining whether to prepare an Environmental Impact Report (EIR), Negative Declaration, or Mitigated Negative Declaration. This is intended to satisfy the requirements of CEQA (Public Resources Code, Div 13, Sec 21000-21177) and the State CEQA Guidelines (California Code of Regulations, Title 14, Sec 15000-15387).

Section 15063(d) of the State CEQA Guidelines states that an IS shall contain the following information in brief form:

1) A description of the project including the location of the project

2) An identification of the environmental setting

3) An identification of environmental effects by use of a checklist, matrix, or other method, provided that entries on a checklist or other form are briefly explained to provide evidence to support the entries

4) Discussion of means to mitigate identified significant effects, if any

5) An examination of whether the project would be consistent with existing zoning, plans, and other applicable land use controls

6) The name of the person or persons who prepared and/or participated in the Initial Study

The environmental checklist form contained in this document is based on Appendix G of the CEQA Guidelines (2022).

2. Project Description

2.1. Project Location

The project is located in Humboldt County, in the Glendale area, at 1689 Glendale Drive, near the intersection of the Highway 299 on-off ramps (see Figure 1 – Project Location, Figure 2 – Project Area, and Figure 3 – Assessor Parcel Numbers).

The project is proposed to occur on sixteen separate parcels owned by two individuals, two companies, and one railroad authority. Two parcels, APNs 516-101-079 and -083 (total 4.06 acres) are owned by Gary & Virginia Island. Ten parcels, APNs 516-101-008, -017, -040, -041, -063, -064, -068, -081, -084, and 516-111-062 (total 39.21 acres) are owned by RGolden Holdings LLC. Two parcels, APNs 516-101-060 and 516-111-063 (1.59 acres) are owned by Blue Lake Forest Products, Inc. Two parcels, APNs 516-101-005 and 516-111-003 (total 1.12 acres) are owned by North Coast Railroad Authority (see Figure 3 - Assessor Parcel Numbers and Table 1 – Ownership and Size of the Project Parcels). Royal Gold, LLC leases and operates on the sixteen parcels.

Figure 1: Project Location

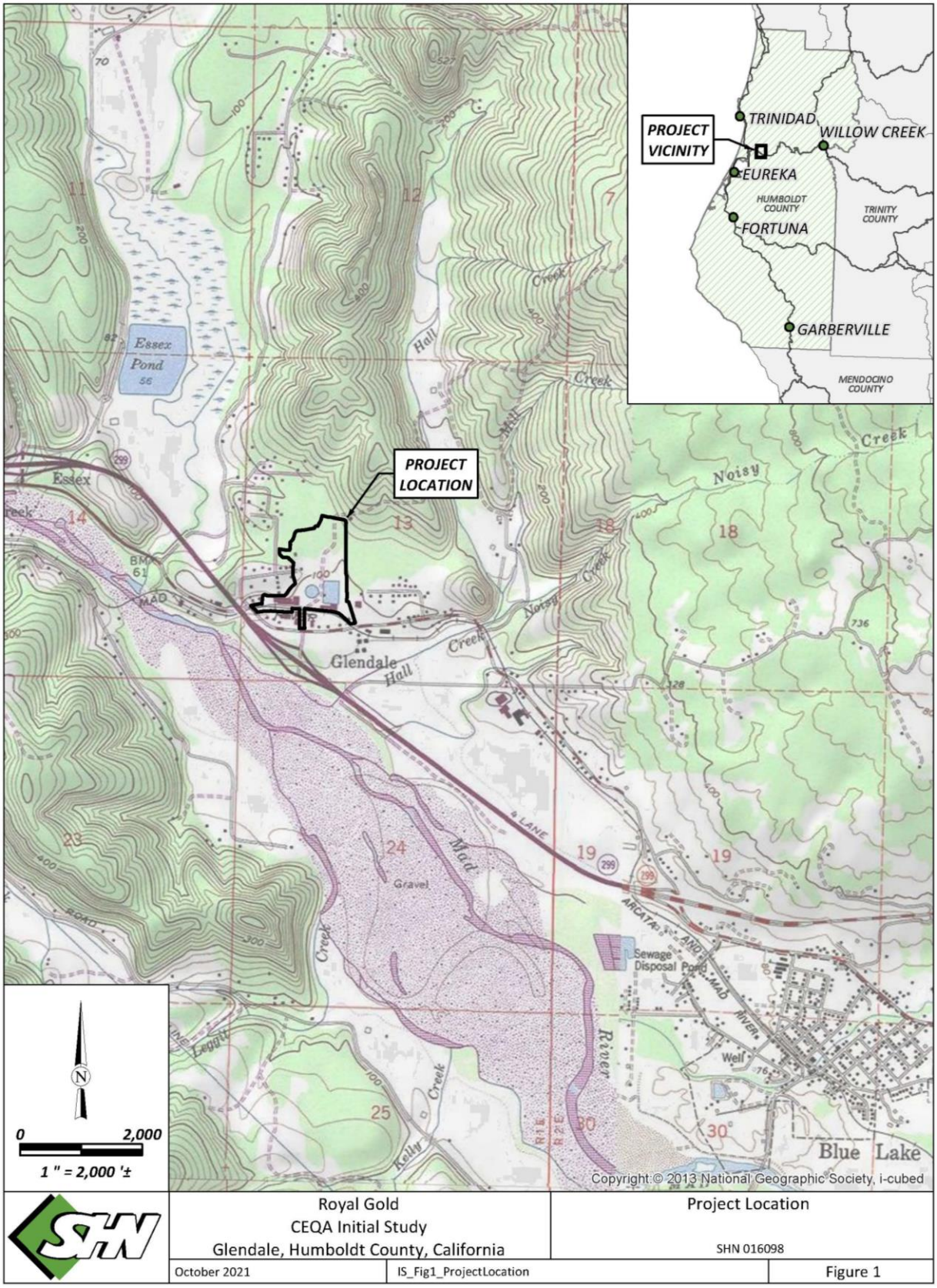


Figure 2: Project Area

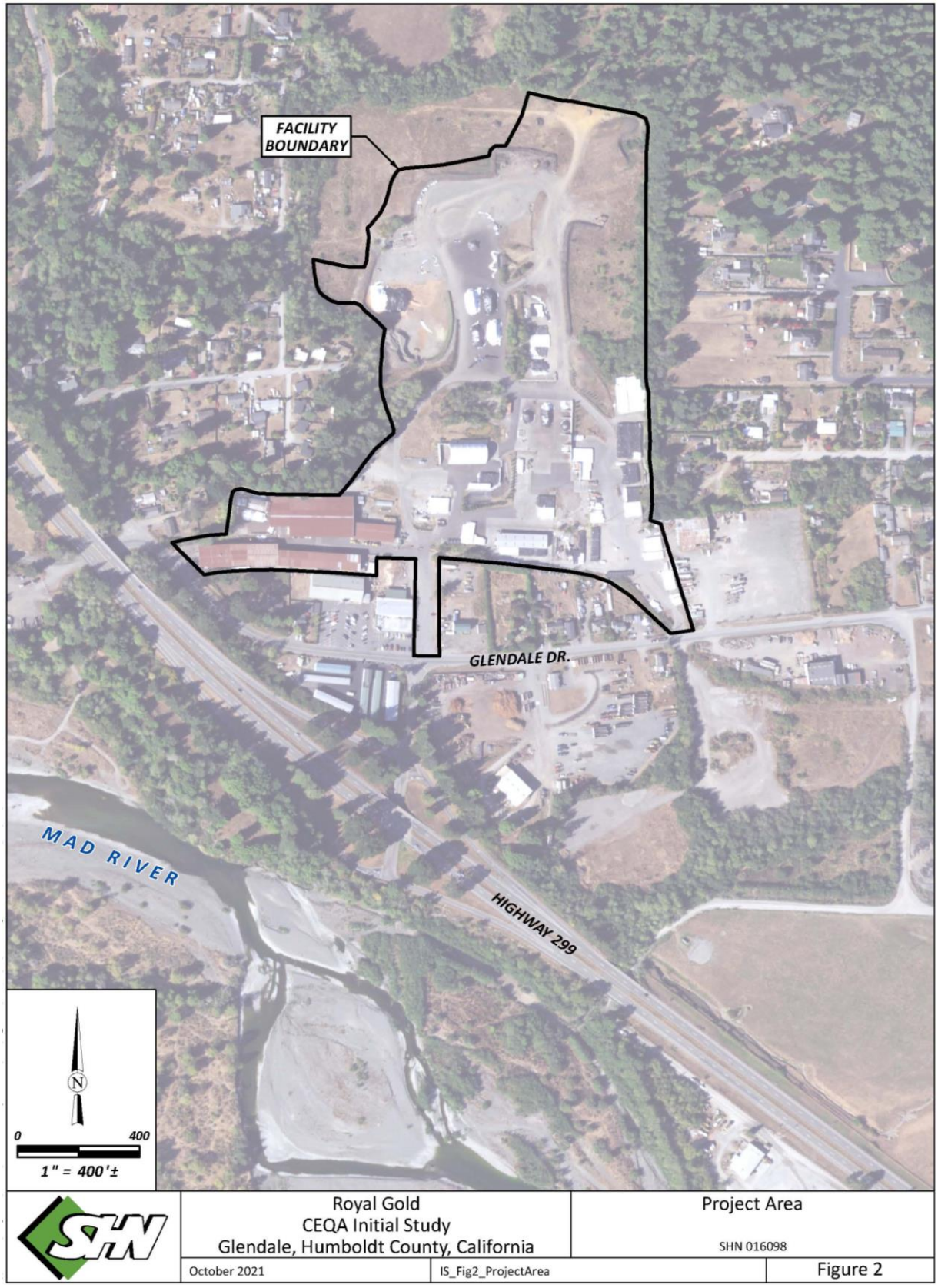
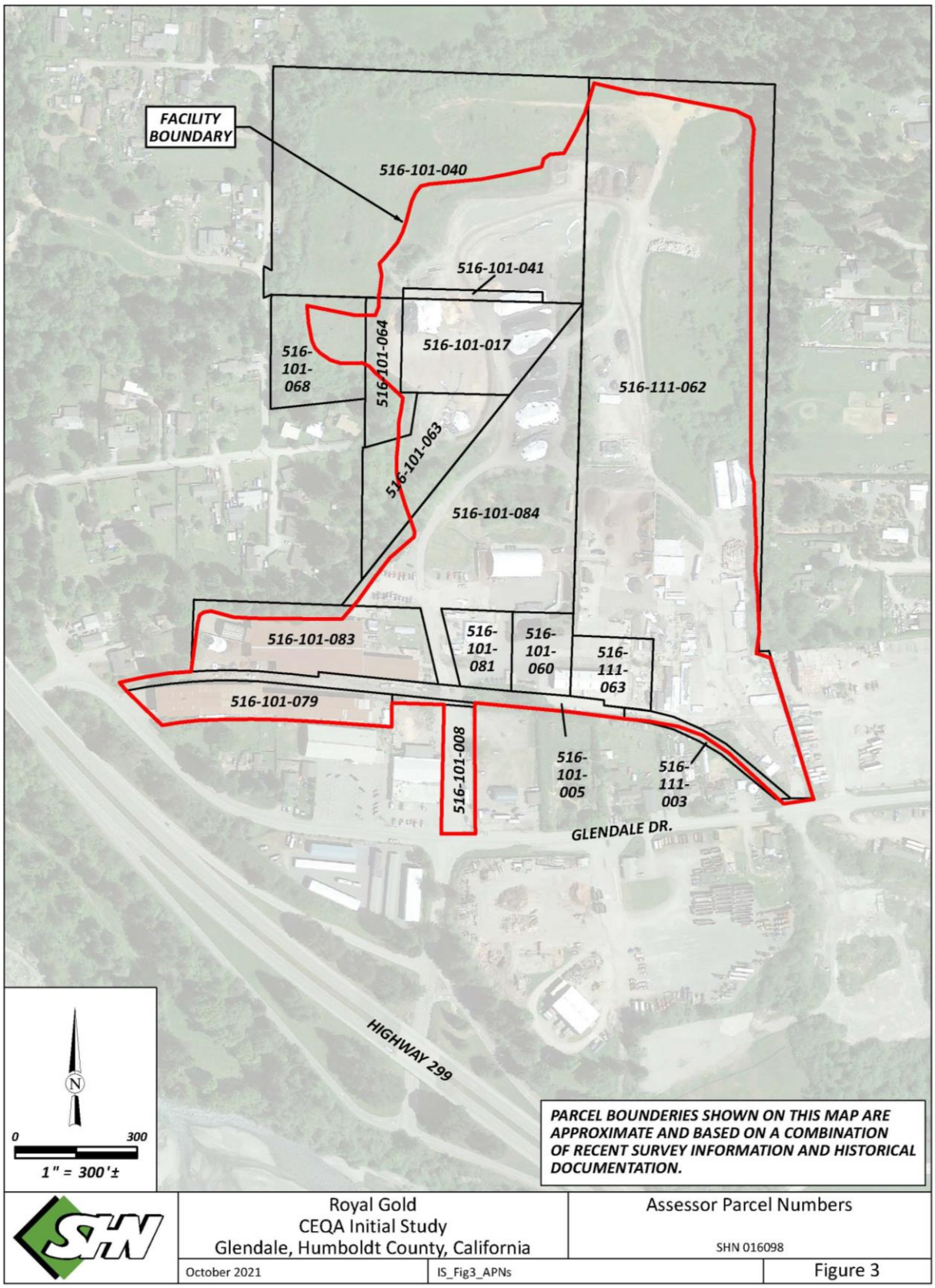


Figure 3: Assessor Parcel Numbers



2.2. Site Background

2.2.1. Site Description

The potting soil and fertilizer manufacturing facility on the sixteen separate parcels is on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 - Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers). Portions of seven parcels, APNs 516-101-040, -063, -064, -068, -083, -084, and 516-111-062, are outside the facility boundary. In total, approximately 12 acres of the seven parcels are not within the facility boundary. The project's location is: SW ¼, Section 13, T6N, R1E, H.B. & M. Arcata North 7.5-min USGS quad sheet. Lat. 40 54' 03", Long. 124 01'19". Elevations at the project site range from approximately 90 feet above sea level in the south to approximately 125 feet in the north.

Table 1: Ownership and Size of Project Parcels

Assessor's Parcel Number	Property Owner	Parcel Size
516-101-005	North Coast Railroad Authority	0.79
516-101-008	RGolden Holdings LLC	0.79
516-101-017	RGolden Holdings LLC	1.83
516-101-040	RGolden Holdings LLC	9.25
516-101-041	RGolden Holdings LLC	0.19
516-101-060	Blue Lake Forest Products Inc	0.89
516-101-063	RGolden Holdings LLC	1.32
516-101-064	RGolden Holdings LLC	0.79
516-101-068	RGolden Holdings LLC	1.40
516-101-079	Gary & Virginia Island	1.44
516-101-081	RGolden Holdings LLC	0.82
516-101-083	Gary & Virginia Island	2.62
516-101-084	RGolden Holdings LLC	4.99
516-111-003	North Coast Railroad Authority	0.33
516-111-062	RGolden Holdings LLC	17.83
516-111-063	Blue Lake Forest Products Inc	0.70

Additionally, Royal Gold was previously using APN 516-111-064 for the storage of raw material (palletized, sealed, and covered) including peat and coco. This parcel is owned by Michael Brosgart and is located directly east of the Royal Gold facility (approximately 250 feet) on the north side of Glendale Drive. The storage area is primarily paved with areas of compacted

gravel. The parcel is flat and slopes down to the west and south with exception to the northern third of the property, which slopes to the north toward a vegetated area. APN 516-111-064 is separated from the Royal Gold facility by another parcel (APN 516-111-066) with a shop, trucks, and trailers. The use of APN 516-111-064 was temporary and has now ceased. Royal Gold proposes to pave additional area in the northeast corner of their facility to store this material.

The existing access road entrances and exits to the facility are located off Glendale Drive (County Road Number 4L765) and are approximately 40-60 feet in width. The primary entrance/exit at the site is in the central southern portion of the facility through APN516-101-008. There are also two additional exits in the southwestern and southeastern corners of the facility on APNs 516-101-079 and 516-111-062 (see Figure 3 – Assessor Parcel Numbers). The primary entrance/exit of the facility is less than 500 feet from the Highway 299 on/off ramps.

2.2.2. Zoning/Land Use

The parcels comprising the Royal Gold facility are all currently zoned Unclassified (U). Through the update of the County's Zoning Classifications, the project parcels will be rezoned for consistency with the recently adopted General Plan Designations.

2.2.3. Historical Use/Environmental Baseline/Existing Condition

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. The western portion of the site (APNs 516-101-079, and -083) was historically used for lumber mill operations by Bonnie Stud Mill, Trend Industries, and ICM Lumber Company. The eastern portion of the site (APNs 516-101-008, -017, -040, -041, -060, -063, -064, -068, -081, and -084, and 516-111-062, and -063) was historically used for lumber mill operations under several different owners from the 1950s to 2002. The eastern portion of the site was operated by Molalla Forest Products, Inc. from approximately the 1950s to March 1969 when it was purchased by the Simpson Timber Company. Simpson never operated the site and soon sold it to McNamara & Peepe (M&P) in May 1969. M&P operated on the site from 1969 to May 1984 when the company filed for bankruptcy. Blue Lake Forest Products, Inc. began operation at the site in 1986, and ceased operations in April 2002, when the company also filed for bankruptcy. After Blue Lake Forest Products, Inc. ceased operations, Gess Environmental conducted a greenwaste recycling and composting operation on the eastern portion of the site for several years prior to moving closer to Arcata. Prior industrial use of the site is shown in Figure 4 – Blue Lake Forest Products Historic Aerial Photo (Unknown Date), which is an aerial photo of the site when it was operated by Blue Lake Forest Products.

Royal Gold, LLC has been in operation since 2005, and has been operating at the project site since March 2009, without holding the required permits from the County Planning & Building Department. Although Royal Gold has been allowed to continue to operate from the site while they seek to secure approval of a Use Permit. The year 2009 is being used as the environmental baseline for the purposes of this analysis, to coincide with the initiation of the current use of the site. Figure 5 – Project Site in Baseline Year (2009) includes an aerial photo showing the condition of the project site in 2009 when Royal Gold began operating from the site.

Figure 4: Blue Lake Forest Products Historic Aerial Photo (unknown date)

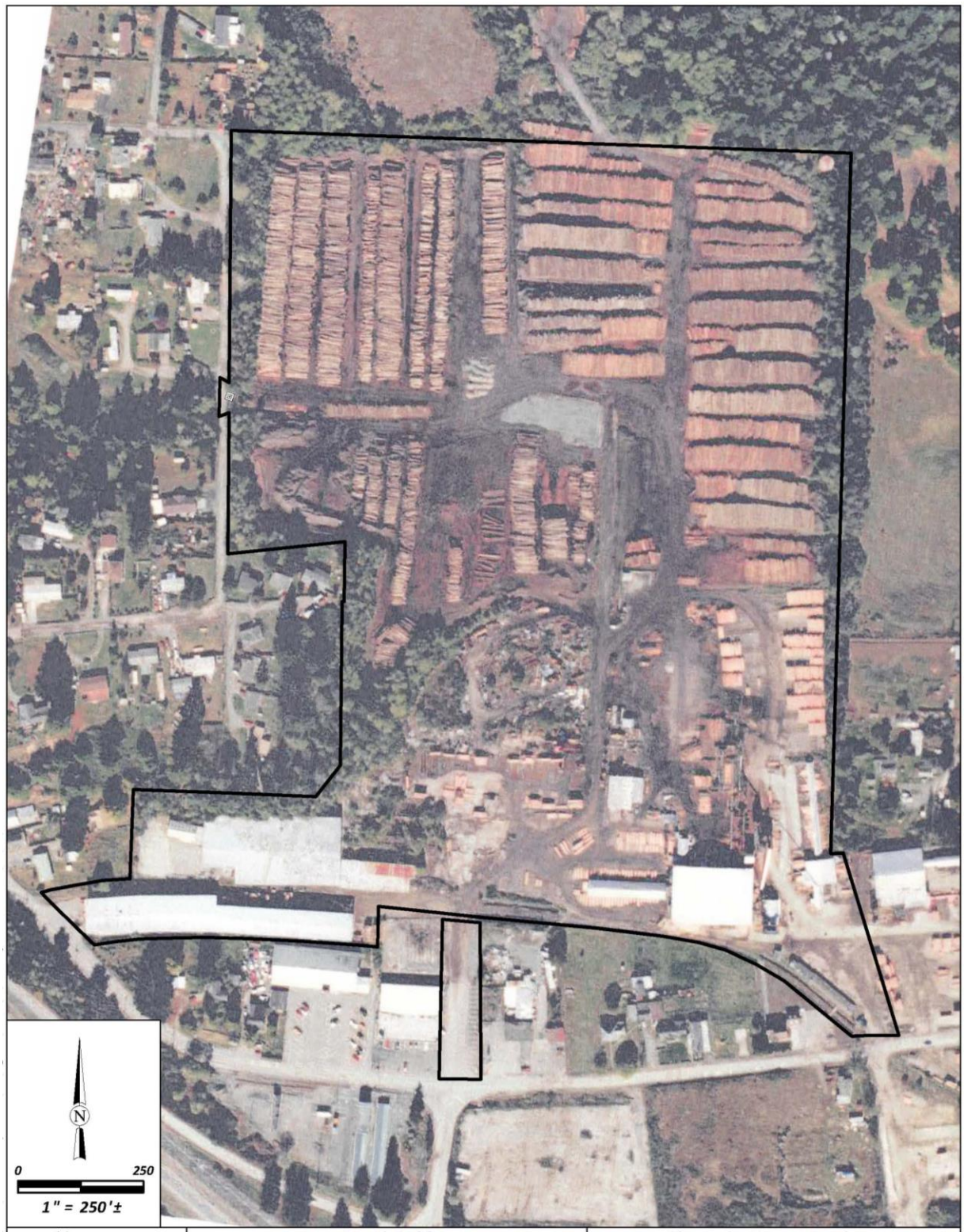


Figure 5: Project Site in Baseline Year (2009)

Since initiating operations at the site, Royal Gold has regularly expanded their operational footprint while completing a series of nearly continuous substantial capital investments aimed at restoring the site and removing remnant debris and equipment from past industrial uses. Royal Gold has also installed security fencing, gates, and cameras to keep trespassers off the property due to problems with theft, vandalism, and various other criminal activities, which were reportedly prevalent on this vacated mill site prior to the company's use of the site.

Royal Gold applied for an after-the-fact Conditional Use Permit in 2013 and received approval from the Humboldt County Planning Commission in August 2016. The description of the project in the Notice of Planning Commission Decision (dated August 5, 2016; Humboldt County, 2016) stated the following:

"*A Conditional Use permit (CUP) is being sought by the applicant (Royal Gold, LLC) to allow manufacturing and distribution of potting soil within an approximately 18.9-acre area spread across multiple parcels in the Glendale area.* ***Note: since March of 2009, Royal Gold has been operating their soil manufacturing, wholesale, and distribution business from the site, without the benefit of County review.*** *The Conditional Use Permit seeks to bring into compliance the existing soil manufacturing operation and allow expansion from approximately 60,000 cubic yards of annual production to 100,000 cubic yards, as well as placement of a new 7,800 square foot building. The proposed membrane structure utilizes an arched truss design and will be placed over an area where stockpiles of material are currently stored and utilized for similar activities. Coco pith is used as the basis for their soil products, though other components include: sawdust, compost, chicken manure, and fish bone. All of the materials used are imported and then processed at the project site. Daily operation primarily involves the importing of organic materials, grinding, screening, sorting, stockpiling, mixing, packaging, and distribution of the final soil product*."

Humboldt Baykeeper, a local non-profit organization, appealed the Commission's approval. Sometime later, Humboldt Baykeeper sued Royal Gold in federal court under the Clean Water Act. Royal Gold and Baykeeper settled the lawsuit in 2017. The primary issues raised in the appeal of the Planning Commission's approval of the Royal Gold Conditional Use Permit related to biological resources, stormwater runoff, and hazardous materials. To address the concerns raised in the appeal, Royal Gold has hired qualified professionals to prepare a number of technical reports and plans including, but not limited to, a Wetland Delineation, Wetland Mitigation and Monitoring Plan, Updated Biological Report including biological surveys, updated Stormwater Pollution Prevention Plan, Soil and Groundwater Management Plan, and the characterization of soils excavated for stormwater improvements. Royal Gold has also worked diligently to improve stormwater management practices at the site to comply with the requirements of their State Water Resources Control Board (SWRCB) Industrial General Permit (IGP) and the settlement agreement with Humboldt Baykeeper. Royal Gold has installed numerous stormwater improvements, which have resulted in a significant reduction in the pollutant concentrations detected in stormwater discharging from the facility. In addition, Royal Gold has improved its operating equipment and protocols and procedure to reduce impacts related to fugitive dust generation, odors, noise, and lighting. These efforts have occurred in close coordination with local, state, and federal regulatory agencies with jurisdiction over the company's activities.

The lawsuit settlement and growth of the business have spurred significant changes in the scale and scope of current and proposed site development and planned infrastructure. Recognizing that these changes to the project scale & scope render the 2016 approval by the Planning Commission insufficient, Humboldt Baykeeper has agreed to withdraw their appeal in tandem with Royal Gold's decision to seek a new Conditional Use Permit and submit to subsequent environmental review.

2.2.4. Surrounding Uses

The project site is located within the unincorporated community of Glendale adjacent to an assortment of properties that were historically used for timber harvesting, industrial uses (for example, lumber milling), commercial uses (for example, grocery store, bowling alley, etc.), as well as rural residential uses. To the north of the site is rural residential development and timberland. To the east of the site are rural residential and industrial uses. To the south of the site are commercial uses, industrial uses, rural residential uses, Glendale Drive, Highway 299, Hall Creek, and the Mad River. To the west of the site are rural residential uses, Glendale Drive, Highway 299, and the Mad River (see Figure 2 – Project Area).

2.3. Project Description

Royal Gold, LLC (Royal Gold) is a premium potting soil and fertilizer manufacturing business located at 1689 Glendale Drive in the unincorporated community of Glendale in Humboldt County (see Figure 1 – Project Location and Figure 2 – Project Area). Royal Gold is the first nationally distributed coco pith-based soil company in the United States. Coco pith is used as the base ingredient for many of the company's soil products, which is a sustainable by-product of the coconut industry. Royal Gold products are primarily made from waste products/by-products including, but not limited to coco pith, sawdust, compost, and fish bone meal. In addition to premium potting soils, Royal Gold also produces an organic fertilizer. Daily operations primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities.

Royal Gold has been operating since 2005 and at the project site since March 2009. Royal Gold applied for an after-the-fact Conditional Use Permit in 2013 (CUP-13-021) and received approval from the Humboldt County Planning Commission in August 2016 (Humboldt County, 2016). Humboldt Baykeeper, a local non-profit organization, appealed the Commission's approval to the Board of Supervisors. Consideration of the appeal was delayed and suspended when Baykeeper filed a lawsuit in Federal Court against Royal Gold under the Clean Water Act. Royal Gold and Baykeeper settled the lawsuit in 2017. Since that time Royal Gold has worked to address the concerns raised in the planning process and implement the settlement agreement. Additionally, growth of the business has necessitated an expansion of operational footprint triggering additional regulatory requirements. The proposed project addresses the expanded operations and improvements at the project site as well as additional proposed improvements (Appendix 5.1 – Plan of Operations; Royal Gold, 2021).

2.3.1. Existing Operations

Royal Gold currently uses this historic industrial site to manufacture and distribute potting soil and fertilizer products. Royal Gold operates year-round, with operating hours between 7 a.m. to 7 p.m., Monday through Saturday. Royal Gold has a total of 72 employees and 60 of these employees work at the facility in Glendale. The remaining employees work in the company's Arcata office and in other states.

The operation primarily involves the blending and mixing of potting soils, raw material processing, and shipping and receiving activities. The majority of mixing and bagging activity currently takes place in the existing pole-shed-style metal buildings in the southwest portion of the facility on APNs 516-101-079 and 516-101-083.

Typical equipment used for the processing and distribution activities includes a horizontal grinder, trommel screener, bale buster, front-end loaders, dump trucks, forklifts, mixing lines, bagging lines, generators, and hauling trucks. Auxiliary equipment necessary for other operations of the facility (in addition to processing and distribution) includes a skid steer, a mini excavator, water trucks, street sweepers, a vacuum trailer, and a light-duty tractor.

The materials used to produce soil and fertilizer products are imported and then processed at the project site. The soil products are primarily packaged in 0.75-, 2-, and 3-cubic-foot bags and 1 and 2-cubic-yard totes. Bulk soil is also available by dump truck loads upon request. The fertilizer products are primarily packaged in 5-, 10-, 20-, and 40-pound bags and a 1,000-pound tote.

Basic operations at Royal Gold include receiving and blending raw and commercially produced materials to create potting soil mixes. A description of how these materials are handled to produce the soil products is provided below. The materials used for the fertilizer products are similar to the amendments used in the soil products.

- Coconut Fiber Processing: Coconut fiber is made from dried and ground coconut husks. It is delivered as compressed bricks that are stacked and wrapped on a pallet. The compressed bricks of fiber are rehydrated and processed for use in the soil mixes.
- Forest Humus Processing: Sawdust is received from several local sources and is stored in several large piles, which are kept tarped until ready to use. The piles are screened prior to use in soil production. Larger material that is screened out and not reprocessed on site is donated to various outlets.
- Peat Processing: Peat is delivered in compressed bales and processed through an industrial bale buster where the material is expanded to be ready for use in soil production.
- Coco Chip Processing: Coco chips are cut but not ground coconut husk fibers that are dried, compressed, and delivered on pallets wrapped in plastic. Coco chips are rehydrated and used in soil production.

- Compost Handling Procedure: OMRI[1] certified organic compost is delivered to the site and stored in an existing metal building on parcels 516-101-060 and 516-111-063. Compost piles are turned once a week or as necessary to maintain quality. This product comes fully processed and is ready to use in soil production.
- Perlite: Flatbed trucks deliver stacked totes of perlite. Totes are stored until they are used in soil production.
- Lava Rock: Bulk lava rock is delivered by a truck and transfer trailer and stored until used in soil production.
- Amendments: Amendments are delivered in either pallets of bagged material or bulk totes and stored under cover until ready for use in soil production.
- Bagging Line Mixing Detailed Description: Bagged soil is mixed in automated mixing lines and bagged in either automated or manual bagging lines. The mixing lines include a series of computer-controlled hoppers that blend all raw materials. Ingredients are placed into hoppers by front-end loader or by hand, within covered structures and on paved surfaces. Amendments are applied by the hoppers to the mixing line in a fully enclosed dust hut where they are incorporated into the soil substrate. The automated line feeds and mixes the ingredients to product specifications. A bagging hopper then feeds soil through a bag chute, where the bags are filled, sealed, flattened, and palletized. The pallets are covered with a topper, wrapped in shrink wrap, and stored under cover until they are ready for shipment. During shipping, packaged product is loaded onto flatbed or enclosed semis for distribution.
- Bulk Mixing Detailed Description: For the production of bulk soil products (bulk totes and loose bulk), ingredients are piled together on a paved surface and blended gently with a front-end loader in the bulk soil yard in the central portion of the facility (see Figure 6 – Site Plan). After being mixed, bulk soil for totes is loaded into the bulk tote hopper, where it is fed by conveyor to a chute used to fill the totes. Finished totes are stacked on pallets and banded to ensure they do not shift or fall over during shipping via flatbed or container semis. The bulk soil that is to be sold loose is stored in piles and covered with tarps until it is ready to be shipped out via covered dump truck.
- Fertilizer Production: For the production of Royal Gold's fertilizer line, ingredients are processed, measured, mixed, and fed into an auger system that leads to the bagging line. Bags are filled, sealed, and placed into boxes which are then stacked, palletized, and covered for storage before shipping out for distribution.

[1] Organic Materials Research Institute, OMRI®

2.3.2. New Improvements

Royal Gold has completed a number of site improvements in the years since the approval and appeal of the Conditional Use Permit in August 2016. They are further discussed below. These improvements are shown in Figure 6 – Site Plan. The revised Conditional Use Permit application includes after-the-fact approval of these newly constructed improvements, as applicable.

- Building A: An approximate 7,800-square-foot (65-foot by 120-foot) building was constructed in the southeast corner of parcel 516-101-084 on an existing concrete pad (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan), without securing all required permits. This building was proposed as part of the original project design approved by the Planning Commission and appealed to the Board of Supervisors in 2016. The building has an arch truss design and is constructed of galvanized steel trusses and a polyethylene fabric cover. It is located on a portion of APN 516-101-084 and conforms to the applicable setbacks from the local Zoning Regulations and State Fire Safe Regulations. The current and proposed use for this building is coconut fiber processing and storage. The processing equipment used in this building includes a horizontal grinder with a diesel engine regulated by the North Coast Unified Air Quality Management District (NCUAQMD) and auxiliary equipment. This equipment is operated with a generator (maximum 40.2 horsepower), as electric service is not currently available in this portion of the site.

- Building B: An approximate 4,380-square-foot (60-foot by 73-foot) building was constructed in the southwest corner of parcel 516-111-062 (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan). This building was not previously proposed as part of the Conditional Use Permit application approved in August 2016. This building, like Building A, has an arch truss design and is constructed of galvanized steel tube trusses and a polyethylene fabric cover. During a recent survey of the property, it was determined that Building B has been constructed across the property line shared between APNs 516-111-062 and 516-111-063. To resolve this issue, the applicant is requesting permission to adjust the boundary line between these parcels. APN 516-111-063 is a state cleanup site and is managed by the Department of Toxic Substances Control (DTSC), who have expressed a willingness to consent to a potential boundary adjustment. The current and proposed use for this building is for peat processing using a bale buster. The processing equipment that is used in this building is operated with a generator (maximum 40.2 horsepower), as electric service is not currently available in this portion of the site.

- Addition to amendment storage building: A metal lean-to-type structure addition (fully enclosed) was constructed on the small metal building in the northwest corner of APN 516-101-083. This building was previously used for amendment storage as labeled on the Site Plan in the Conditional Use Permit application approved in 2016. Since construction of the addition to this building, it is now used for the processing and packaging of a dry fertilizer line called “Crown Jewels” (see Figure 6 - Site Plan).

- Fueling station: A fueling station was installed under the pole-shed-type structure in the southeastern portion of APN 516-101-083. The fueling station is used for providing fuel

(such as, gasoline, diesel, and propane) to the off-road heavy equipment used at the facility. The tanks at the fueling station are aboveground and include:

  - Two (2) five-hundred-gallon, double-wall steel tanks on steel saddles
  - One (1) 110-gallon single-wall steel tank with a plastic secondary containment
  - One (1) 200-gallon propane cylinder that is used to fill the fuel tanks for the forklifts

- Generators: Several generators are used at the site to operate equipment in areas where electric service is not available. As noted above, generators are currently used in Buildings A and B. In addition, generators are used as the energy source for bulk tote packaging on the eastern portion of the site and for power tools used for maintenance activity in various portions of the site. As discussed below under Proposed Improvements/Operational Changes, the generators will not be required when electric service is connected to the remaining portions of the site. The generators currently used at the site include:
  - 2,000-watt Generac gasoline generator – Model: IQ2000, 2.7 hp
  - 3,000-watt Honda gasoline generator – Model: EU3000is, 4 hp
  - 7,000-watt Honda gasoline generator – Model: EU7000is, 9.4 hp
  - 20 kW Whisperwatt diesel generator – Model: DCA-25SSIU4F, 40.2 hp
  - 20 kW PowerPro diesel generator – Model: SDG25S, 31.5 hp
- Stormwater improvements: Numerous stormwater improvements have been constructed throughout the site to comply with the requirements of the SWRCB Industrial General Permit (IGP) and the settlement agreement with Humboldt Baykeeper. These improvements are identified in the current Stormwater Pollution Prevention Plan (SWPPP) for the facility (SHN, 2021c).
- Paving: Several portions of the project site have been paved to improve site access and stormwater management, provide additional areas for the storage of materials, minimize fugitive dust, and address concerns about disturbing onsite soils. Some of these paving activities were completed as part of the settlement agreement with Humboldt Baykeeper.
- Filling of wetlands: As discussed in the Wetland Mitigation and Monitoring Plan Addendum 1 (SHN, 2020) prepared for the Royal Gold facility, approximately 0.83 acres (36,155 square feet) of Clean Water Act "jurisdictional wetlands" have been determined to have been impacted at the site. The majority of these former wetlands (0.73 acres or 31,799 square feet) were located in the central portion of the site and were converted into stormwater detention basins to comply with the Clean Water Act. The remainder of these wetlands (0.10 acres or 4,356 square feet) were filled for use as paving, parking, storage, and coco processing. As discussed below under Proposed Improvements/Operational Changes, these wetland impacts will be mitigated through construction of a wetland mitigation area in the northwestern portion of the site on APNs 516-101-040, -064, and -068. A Special Permit will be required for the jurisdictional wetlands, encroachments into SMAs, and the wetland mitigation area. Royal Gold is coordinating with state and federal agencies (for example, USACE, NCRWQCB, and CDFW) for the necessary permits.

- Construction of berms: As shown on Figure 6 – Site Plan, several earthen berms have been constructed in the northern portion of the site to minimize noise and fugitive dust impacts. The berms were constructed using imported fill and aggregate material.
- Security fencing: Chain link security fencing (6-foot height) was installed on the southern portion of the site where the majority of equipment and finished product is stored. This was done to mitigate trespassing, vandalism, and theft at the Royal Gold facility.
- Portable office buildings: Two portable office buildings have been rented and are located on the eastern edge of APN 516-101-079, adjacent to the existing pole-shed-style metal building. It is anticipated that these portable structures will only be onsite temporarily, in response to the current COVID-19 pandemic. For this reason, they are not shown on the Site Plan. As discussed below under Proposed Improvements/Operational Changes, it is eventually proposed to construct a new building or expand the existing building at this location.
- Temporary Storage on APN 516-111-064: As discussed under Section 2.2.1 – Site Description, Royal Gold was using APN 516-111-064 for the storage of raw material (palletized, sealed, and covered) including peat and coco. This parcel is located directly east of the Royal Gold facility (approximately 250 feet) on the north side of Glendale Drive. The storage area is primarily paved with areas of compacted gravel. APN 516-111-064 is separated from the Royal Gold facility by another parcel (APN 516-111-066) with a shop, trucks, and trailers. The use of APN 516-111-064 was temporary and has now ceased. Royal Gold proposes to pave additional area in the northeast corner of their facility to store this material (see Figure 6 – Site Plan).

2.3.3. Proposed Improvements/Operational Changes

As part of the revised application for a Conditional Use Permit, Royal Gold is proposing several new buildings, additional utility infrastructure, and other related improvements to accommodate the needs of its growing business. Several of these improvements are shown as proposed on Figure 6 – Site Plan and are described further below. In addition to the proposed improvements, Royal Gold is also proposing operations on Sundays from 8 a.m. to 6 p.m.

- Paving: Pavement of additional areas in the northern portion of the site is proposed to improve site access and stormwater management, provide additional areas for the storage of materials, minimize fugitive dust, and address concerns about disturbing onsite soils (see Figure 6 – Site Plan).
- Electric utility infrastructure: Installation of electric utility infrastructure is proposed to serve the new buildings at the site that were constructed after the Conditional Use Permit approval in August 2016. These buildings are labeled as Buildings A and B on Figure 6 – Site Plan. As previously noted, these existing buildings are used for coconut fiber processing (Building A) and peat processing (Building B). Once electricity is provided, these buildings will continue to be used for coconut fiber and peat processing, and equipment currently operated using generators will be connected to the electrical service.

- Building C: Construction of an approximately 14,000-square-foot (200-foot by 70-foot) building directly south of Building A and associated utility infrastructure (for example, electricity, water, etc.) (see Figure 6 – Site Plan). This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it would require exceptions to the setback requirements in the Fire Safe Regulations, due to internal parcel lines. Building C is proposed to be used for the storage and processing of coconut fiber.
- Building D: Construction of an approximately 30,000-square-foot (100-foot by 300-foot) building in the central northern portion of the site and associated utility infrastructure (for example, electricity, water, etc.) (see Figure 6 – Site Plan). This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it is located on a portion of APN 516-111-062 that may require an exception to the setback requirement in the Fire Safe Regulations, due to internal parcel lines. Building D is proposed to be used for the storage and processing of various raw and finished materials.
- Building E: Construction of an approximately 42,500-square-foot (250-foot by 170-foot) building and associated utility infrastructure (for example, electricity, water, etc.) in the central portion of the site in the area currently used as the bulk soil yard. This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it is located on a portion of APN 516-111-062 that may require an exception to the setback requirement in the Fire Safe Regulations, due to internal parcel lines. This building would be used for the processing, storage, and packaging (as applicable) of soil material, as is currently occurring in this area of the site. If electric service is not yet available from PG&E at the time that construction of the building is completed, electricity to the building is proposed to be supplied with a 160-kW generator.
- Building F or Addition to Existing Building: This improvement would involve either: 1) construction of an approximately 2,000-square-foot (40-foot by 50-foot) two-story building adjacent to the eastern edge of the existing pole-shed-style metal building on APN 516-101-079; or 2) construction of an approximately 2,000-square-foot addition to the eastern portion of the existing pole-shed-style metal building on APN 516-101-079 (see Figure 6 – Site Plan). Both potential options would be constructed of metal. If a new, standalone building is constructed, it appears that it would require exceptions to the requirements for the minimum distance between major buildings and the maximum ground coverage. If an addition to the existing building is constructed, it appears that it would require an exception to the requirements for maximum ground coverage. Both potential options noted above are proposed to be used for bathrooms and offices. The bathrooms would be connected to the Fieldbrook-Glendale Community Services District (FGCSD) sanitary sewer wastewater collection system. Fueling station: Construction of a new aboveground fueling station at the facility that would be used for fueling the heavy equipment used onsite. The new fueling station will include a double-wall steel tank for diesel fuel, no larger than 5,000 gallons, that meets UL-2085 standards and all relevant building and fire codes for California. The specific location of the fueling station has not been finalized but will be located away from waterways and combustible materials as recommended by the National Fire Protection Association (NFPA). The tank will be installed on a concrete pad and a metal structure will be erected above the fuel tank to

prevent stormwater from contacting the tank or pumps. A 1,000-gallon propane cylinder is also proposed to be located in the vicinity of the fueling station. It is anticipated that the Royal Gold facility will be regulated as a Tier 1 qualified facility and will comply with requirements of a Tier 1 Spill Prevention, Control, and Countermeasure (SPCC) plan.

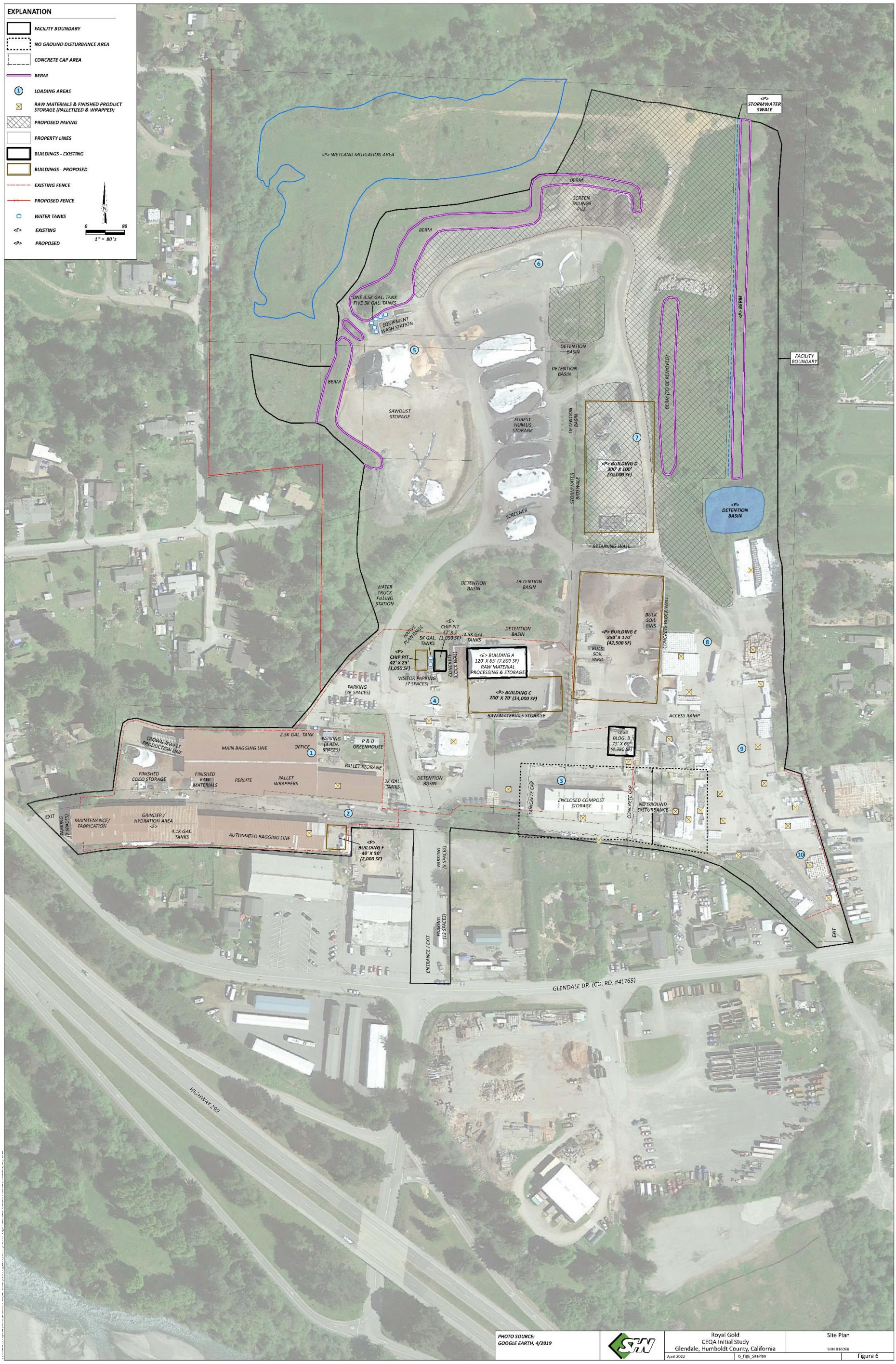
- Additional wetland impacts and stormwater improvements: As part of full buildout of their facility, Royal Gold is proposing to impact approximately 0.74 acres of additional wetlands in the central eastern portion of the site. This additional wetland area is proposed to be converted to stormwater detention basins or filled and developed as paving, storage areas, stormwater swales, and earthen berms. The additional stormwater improvements are necessary to manage the additional stormwater runoff from the new impervious surfaces proposed in the northern eastern portion of the site (for example, Building D and additional paving). The modified SMA boundaries that would result from the additional wetland impacts and improvements are illustrated in Figure 19 – Site Plan with Streamside Management Areas at Full Buildout. A Special Permit will be required for the proposed wetland impacts and encroachments into SMAs. As required, Royal Gold is coordinating with applicable state and federal agencies (for example, USACE, NCRWQCB, and CDFW) to obtain permits for these activities.
- Wetland mitigation area: Construction of a wetland mitigation area in the northwestern portion of the site (APNs 516-101-040, -064, and -068) to mitigate for existing and proposed impacts to wetlands at the site. As discussed in the Wetland Mitigation and Monitoring Plan Addendum 1 (SHN, 2020) prepared for the Royal Gold facility, these impacts would be mitigated at a 2:1 ratio, resulting in approximately 3.18 acres (138,520 square feet) of three-parameter wetlands. A Special Permit will be required for the proposed construction of the wetland mitigation area. As required, Royal Gold is coordinating with appropriate state and federal agencies (for example, USACE, NCRWQCB, and CDFW) to obtain permits for these activities.
- New equipment: Use of an electric coir buster[2] for processing of coco bricks is proposed as an alternative to the existing diesel horizontal grinder used at the site. The coir buster may not completely replace the horizontal grinder but would minimize its use. The coir buster generates lower noise levels than the horizontal grinder, which has the potential to reduce noise levels produced by the processing activity at the facility.
- Security fencing: Installation of chain link security fencing (6-foot height) is proposed around all remaining areas of the facility where equipment or materials are stored. The security fencing may include barbwire or razor wire if it is determined necessary to deter trespassing. This is proposed due to continued trespassing, vandalism, and theft at the

[2] Coir is a natural fiber extracted from the husk of coconut and used in products such as floor mats, doormats, brushes, mattresses, etc.

Royal Gold facility. The primary focus for security fencing will be along the western boundary of the facility where most of the trespassing occurs by adjacent residents.

- Security lighting: Installation of security/perimeter lighting is proposed around the facility boundary adjacent to existing and proposed security fencing. All lighting fixtures are proposed to comply with the requirements of the International Dark-Sky Association (IDA) for reducing waste of ambient light (such as, "dark sky compliant"). This includes, but is not limited to, requirements for acceptable fixture types and maximum color temperature.

Figure 6: Site Plan



3. Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by the proposed project and would involve at least one impact that is determined to be a "Potentially Significant Impact" as indicated by the checklist on the follow pages of this report.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology/Soils	☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials
☐ Hydrology/Water Quality	☐ Land Use / Planning	☐ Mineral Resources
☐ Noise	☐ Population / Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities / Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

A detailed explanation of all responses follows in Section 3.2 of this report. All answers take into account the whole action involved, including offsite as well as onsite; cumulative as well as project-level; indirect as well as direct; and construction as well as operational impacts. The explanation of each issue identifies: (a) the significance criteria or threshold, if any, used to evaluate each question; and (b) the mitigation measure identified, if any, to reduce the impact to a less-than-significant level.

3.1. Determination

(To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature _____ Date _____

3.2. Evaluation of Environmental Impacts

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each questions. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (for example, the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (for example, the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2) All answers must take account of the whole action involved, including offsite as well as onsite, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).
5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
    a) Earlier Analysis Used. Identify and state where they are available for review.
    b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c) Mitigation Measures. For effects that are "Less Than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (for example, general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be citied in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The analysis of each issue should identify:

   a) the significance criteria or threshold used to evaluate each question; and

   b) the mitigation measure identified, if any, to reduce the impact to less than significant.

3.2.1 Aesthetics

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. It is located on sixteen separate parcels on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 – Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers).

When Royal Gold moved to the project site in 2009, the site had minimal aesthetic value, with the presence of several industrial pole-shed buildings, concrete and asphalt paving, compacted gravel surfaces, stormwater infrastructure, a large aggregate stockpile, and remnant debris and equipment from past industrial uses (see Figure 5 – Project Site in Baseline Year [2009]).

The existing visual character of the site and its surroundings primarily include an existing industrial site surrounded by the following:

North: Rural residential development and timberland.

East: Rural residential and industrial uses.

South: Commercial uses, industrial uses, rural residential uses, Glendale Drive, Highway 299, Hall Creek, and the Mad River to the south.

West: Rural residential uses, Glendale Drive, Highway 299, and the Mad River.

Figures 7-10 show the current public views of the site from Glendale Drive and Highway 299.

Figure 7: View of southwest edge of Royal Gold site from Highway 299 Overpass

Figure 8: View of southwest exit at Royal Gold site from Glendale Drive

Figure 9: View of main entrance/exit at Royal Gold site from Glendale Drive

Figure 10: View of southeast exit at Royal Gold site from Glendale Drive

Analysis:

a) *Have a substantial adverse effect on a scenic vista?*
Less-than-significant Impact.

For this analysis, a "scenic vista" is considered a viewpoint that provides expansive views of a scenic resource. The Scenic Resources section (Chapter 10.7) of the Humboldt County General Plan (Humboldt County, 2017a) includes the following when discussing scenic resources: forests, open space, agricultural lands, scenic roads, rivers, and various features associated with the coastline.

There are no scenic vistas immediately surrounding the project site; however, operations at the project site are visible from Glendale Drive (see Figures 8-10) and for a short distance in both directions on Highway 299 (see Figure 7). The existing vegetation and surrounding development partially screen the project site from a person viewing it from these areas. These existing visual barriers will not be removed or impacted by this project. Therefore, the proposed project will not have a substantial adverse effect on a scenic vista and the project would result in a less-than-significant impact on this category of environmental effect.

b) *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway?*
No Impact.

California's Scenic Highway Program was created by the State Legislature in 1963. According to Caltrans' California Scenic Highway Program, the project site is not located near an officially designated State scenic highway (Caltrans, 2021). Highway 299 is listed as an eligible State scenic highway but is not officially designated. The project will be visible for a short distance travelling in either direction on Highway 299, but the proposed project will not impact visual scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within an officially designated State scenic highway. Therefore, the proposed project would result in no impact on this category of environmental effect.

c) *In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?*
Less-than-significant Impact.

When Royal Gold moved to the project site in 2009, the site had minimal aesthetic value with the presence of several industrial buildings, concrete and asphalt paving, compacted gravel surfaces, stormwater infrastructure, a large aggregate stockpile, and remnant debris and equipment from past industrial uses. At that time, the properties surrounding the project site primarily consisted of commercial, industrial, and rural residential uses (see Figure 5 – Project Site in Baseline Year [2009]).

The project site will be visible from Glendale Drive and for a short distance in both directions on Highway 299. Existing public views of the site reflect an existing industrial site with industrial pole-shed metal and arch-truss polyethylene buildings, concrete and asphalt paving, compacted gravel surfaces, soil and material stockpiles, wrapped/palletized raw materials and finished product, and various equipment. These features are consistent with the aesthetic baseline for the site and Glendale's history of industrial uses. Figures 7-10 show the current public views of the site from Glendale Drive and Highway 299.

Considering that the site has been used for industrial purposes since the 1950s, and the surrounding area has a history of heavy industrial use, the baseline visual character and quality of the site and surroundings is low.

Construction

During the construction activities for the proposed improvements to the facility, views of the project site would include construction equipment, graded surfaces and stockpiles, staging areas, and truck traffic. Considering that most of the proposed improvements will be constructed in the central and northern portions of the site, public views of the construction activity for these improvements would be limited from Glendale Drive and Highway 299.

Construction is anticipated to occur over several years and will be a short-term impact consistent with other construction activity in the County. Considering that the project site was a dilapidated former lumber mill site when Royal Gold moved there in 2009, it is not anticipated that the proposed construction activity would substantially degrade the visual character or quality of public views of the site and its surroundings.

Operation

Following construction of the proposed improvements, the project site will continue to be used in the way it has since 2009, for the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan). As shown in Figure 6 – Site Plan and the photos in Figures 7-10, with existing development and vegetation surrounding the project site, public views of the site are primarily available from adjacent public roadways at the entrances/exits to the site.

The proposed improvements are consistent with the past and present industrial uses of the site as well as with the Industrial General (IG) General Plan designation that was applied to most of the project parcels. Considering the historically low visual quality of the project site and surrounding industrial properties and the limited public views of the site, the proposed project would not substantially degrade the visual character or quality of the site and its surroundings.

Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

d) *Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?*
Less-than-significant with Mitigation Incorporated.

When Royal Gold moved to the site in 2009, there was existing lighting within the pole-shed-style metal structures on APNs 516-101-079 and 516-101-083 (see Figure 3 – Assessor Parcel Numbers). The lighting is directed downward and shielded to reduce light spillover to adjoining properties to the maximum extent feasible. Royal Gold has made some improvements to the lighting since moving to the site, but has not added any additional lighting to other areas of the site. The existing lighting within the structures on APNs 516-101-079 and 516-101-083 is described below.

The structure on APN 516-101-079 previously had ten high-pressure sodium lights hanging from the ceiling above the grinder/hydration area (see Figure 6 – Site Plan). These lights were two strips of five lights (but only one of the ten lights is on at night, to minimize light spilling onto the adjacent residential property to the south). The high-pressure sodium lights were recently replaced with LED lighting to conserve energy and reduce potential lightings impacts. Additional improvements to this structure that reduce lighting spillover include: 1) the eastern portion of the structure has been enclosed; and 2) several geotextile nylon screens (60% shade, fabric weave shade cloth) hang from the southern side of the structure. There are also two additional LED motion sensing lights mounted on the wall of this structure.

The structure on APN 516-101-083 has eighteen fluorescent lights on the ceiling above the main bagging line and the raw material bins (see Figure 6 – Site Plan). This structure also had six high-pressure sodium lights and has four new halogen lights (all of which are off when operations cease). The high-pressure sodium lights were recently replaced with LED lighting to conserve energy and reduce potential lightings impacts.

These existing measures effectively reduce lighting and glare onto adjacent properties. Additionally, the current lighting at the facility is significantly less than the lighting used when the lumber mill operated and is less than lighting currently used at adjacent industrial and commercial properties.

Royal Gold does not operate at night, but security lighting at the site remains on 24 hours per day, 7 days per week. This lighting has successfully minimized trespassing on the property and is necessary for security cameras to pick up activity.

As discussed in Section 2.3 – Project Description, Royal Gold proposes to install security/perimeter lighting adjacent to existing and proposed security boundary fencing. To prevent a potentially significant impact (new source of substantial light which could adversely affect nighttime views in the area), Mitigation Measure AE-1 will be implemented. Mitigation Measure AE-1 requires that all new outdoor lighting fixtures shall comply with the International Dark-Sky Association's (IDA) requirements for reducing waste of ambient light ("dark sky compliant"). This includes, but is not limited to, requirements for acceptable fixture types and maximum color temperature. Compliance with IDA recommendations for the proposed security/perimeter lighting will significantly reduce lighting spillover on adjacent residential properties and natural areas (for example, intermittent drainages and seasonal wetlands). The

IDA recommendations can be found on their website at the following address: https://www.darksky.org/our-work/lighting/lighting-for-citizens/lighting-basics/ (IDA, 2021).

With the incorporation of Mitigation Measure AE-1, the project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area. Therefore, the proposed project would result in a less-than-significant impact with mitigation incorporated on this category of environmental effect.

Mitigation Measures:

AE-1. International Dark-Sky Association Compliance: All new outdoor lighting fixtures shall comply with the International Dark-Sky Association's (IDA) requirements for reducing waste of ambient light (such as, shall be "dark sky compliant"). This includes, but is not limited to, requirements for acceptable fixture types, shielding, and maximum color temperature. The IDA recommendations can be found on their website at the following address: https://www.darksky.org/our-work/lighting/lighting-for-citizens/lighting-basics/. To ensure compliance with the IDA recommendations, the applicant shall submit a Lighting Plan to the Humboldt County Planning and Building Department for review and approval as part of the building permit application process.

Findings: The project will have a **Less-than-significant Impact with Mitigation Incorporated** on Aesthetics.

3.2.2 Agriculture and Forestry Resources

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by PRC section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forestland to non-forest use?	☐	☐	☐	☒

Environmental Setting:

The site is located within the unincorporated community of Glendale and surrounding land uses include a mixture of commercial, industrial, and rural residential uses. The project parcels are zoned Unclassified (U) and the site has been used for industrial purposes since the 1950s.

The Farmland Mapping and Monitoring Program of the California Department of Conservation (CDC) has not yet mapped farmland in Humboldt County (CDC, 2021a). The Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS) soil mapping shows that soils on approximately 55% of the site are Timmons and Lepoil soils, 0 to 2 percent slopes (map unit symbol 185), which are classified as "prime farmland if irrigated." Soils on approximately 44% of the site are Lepoil-Candymountain complex, 2 to 15 percent slopes (map unit symbol 257), which are classified as "not prime farmland." Soils on approximately 1% of the site are Lepoil-Espa-Candymountain complex, 15 to 50 percent slopes (map unit symbol 258), which are classified as "not prime farmland" (NRCS, 2021).

As the project site was previously disturbed and modified in association with historic industrial development, ground surfaces primarily consist of pavement and compacted gravel fill, despite the underlying soils being currently mapped as "prime farmland if irrigated." As shown in Figure 6 – Site Plan, soils of the project site are characteristic of urban soils unfit for agricultural production.

Analysis:

a) *Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?*
Less-than-significant Impact.

The Farmland Mapping and Monitoring Program of the California Resources Agency has not yet mapped farmland in Humboldt County. While the NRCS WSS indicates the site contains soils classified as "prime farmland if irrigated," the project parcels were previously disturbed and modified in association with historic industrial development. As such, the soil classifications identified in the NRCS WSS are not reflective of onsite soil conditions.

Therefore, the proposed project would not convert farmland designated as prime, unique, or of statewide importance. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

b) *Conflict with existing zoning for agricultural use, or a Williamson Act contract?*
No Impact.

The parcels containing the project site are zoned Unclassified (U) and are not subject to Williamson Act contracts (Humboldt County, 2021a).

Therefore, the proposed project would not conflict with existing zoning for agricultural use, or a Williamson Act contract, and no impacts would result from the proposed project.

c) *Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by PRC section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?*
No Impact.

Although small portions of the parcels containing the approximately 34-acre project site are forested and contain soils suitable for timber production (NRCS, 2021), the parcels are not zoned for timber production and have been utilized for industrial operations since the 1950s. The referral response received from CAL FIRE on April 6, 2021 confirmed that the project does not involve "Timberlands" as defined by PRC Section 4526 (Madsen, 2021).

Therefore, the proposed project would not conflict with zoning for, or cause the rezoning of, forest land or timberland, and no impacts would result from the proposed project.

d) *Result in the loss of forest land or conversion of forest land to non-forest use?*
No Impact.

The parcels containing the project site were utilized in the past for industrial uses, including for the milling of lumber, but the property was never zoned for or consistently managed for the harvesting of timber.

Therefore, the proposed project would not result in the loss of forest land or conversion of forest land to non-forest use.

e) *Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forestland to non-forest use?*
No Impact.

The proposed project will not produce significant growth inducing or cumulative impacts that will result in the conversion of farmland or forestland. Growth inducing impacts are generally caused by projects that have a direct or indirect effect on economic growth, population growth, or land development. The project proposes the reuse of a property that was previously developed and historically used for industrial purposes. It therefore does not contain farmland or forestland. Properties adjacent to the project site are used for commercial, industrial, and residential purposes. While there are many other properties in the surrounding Mad River Valley that are used for crop production and grazing, there is no reason to believe that the permitting of a soil manufacturing operation on parcels historically used for industrial purposes will result in the conversion of farmland or forestland in the project area to other unrelated uses.

Mitigation Measures: No mitigation required.

Findings: The project will have a **Less-than-significant Impact** on Agriculture and Forestry Resources.

3.2.3 Air Quality

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
d) Create objectionable odors affecting a substantial number of people?	☐	☒	☐	☐

Environmental Setting:

The project site is located in Humboldt County, which lies within the North Coast Air Basin (NCAB). The NCAB extends for 250 miles from Sonoma County in the south to the Oregon border. The climate of NCAB is influenced by two major topographic units: the Klamath Mountains and the Coast Range provinces. The climate is moderate with the predominant weather factor being moist air masses from the ocean. Average annual rainfall in the project area is approximately 50 to 55 inches with the majority falling between October and April (WRCC, 2021).

The NCAB enjoys some of the best air quality in State, which is aided by winds off the ocean. Predominant wind direction is typically from the northwest during summer months and from the southwest during storm events occurring during winter months. Wind helps disperse air pollution; whereas calm periods can allow it to build up to unhealthy levels. Temperature inversions, which occur when a layer of warm air traps cool air near the surface creating a lid, inhibit the vertical dispersion of pollutant emissions. Inversions occur most commonly in the Mad River Valley area during winter months and trap emissions of all types near the surface. Dispersion usually occurs when a frontal system, sometimes bringing strong winds, passes over the area disturbing the temperature inversion, which allows pollutants to disperse vertically and horizontally.

Humboldt County is listed as in "attainment" or "unclassified" for all the federal and state ambient air quality standards except for the state 24-hour particulate matter (PM_{10}) standard, which relates to concentrations of suspended airborne particles that are 10 micrometers or less in size (NCUAQMD, 2021).

Sensitive Receptors

Sensitive receptors (for example, children, senior citizens, and acutely or chronically ill people) are more susceptible to the effect of air pollution than the general population. Land uses that are considered sensitive receptors typically include residences, schools, parks, childcare centers, hospitals, and retirement homes. There are no schools, parks, childcare centers, hospitals, or

retirements homes in the vicinity of the project site. The nearest school is approximately 1.6 miles to the southeast (Blue Lake Elementary School). The nearest park is approximately 1.7 miles to the southeast (Perigot Park). There are residential properties surrounding the Royal Gold facility. The closest residences to the most active areas at the facility are located to the west, south, and north of the southwest portion of the site adjacent to APNs 516-101-079 and -083. The closest residence to the west is within approximately 40 feet of the western boundary of APN 516-101-083. The closest residence to the south is within approximately 90 feet of the southern boundary of APN 516-101-079. The closest residence to the north is located on a bluff above the project site and is within 120 feet of the northern boundary of APN 516-101-083 (see Figure 2 – Project Area, Figure 3 – Assessor Parcel Numbers, and Figure 6 – Site Plan).

Odors

Odors generally are regarded as a nuisance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (for example, anger or anxiety) to physiological (for example, circulatory and respiratory effects, nausea, vomiting, or headache). The ability to detect odors varies considerably among the population and the odor interpretation is subjective. Some individuals have the ability to smell small quantities of specific substances. Others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor. An odor that is offensive to one person (for example, from a fast-food restaurant) may be perfectly acceptable to another. Unfamiliar odors are detected more easily than familiar odors and are more likely to be offensive (Siskiyou County, 2017). Odors present on a periodic basis in the project area when Royal Gold moved to the site in 2009 were generated from grazing operations in the Mad River Valley, cannabis operations (medical and unpermitted), open burning, the City of Blue Lake wastewater treatment plant, vehicular emissions from traffic on Glendale Drive and Highway 299, and equipment emissions from industrial uses.

Regulatory Setting:

Criteria Air Pollutants

The Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants (also known as "criteria air pollutants") (EPA, 2018b). Concentrations of criteria air pollutants are used as indicators of ambient air quality conditions. The EPA has established a maximum concentration (air quality standard) for each criteria air pollutant, above which adverse effects on human health may occur. When an area does not meet the air quality standard for one of the criteria air pollutants, it may be subject to the formal rule-making process, which designates it as nonattainment.

The CAA further classifies ozone, carbon monoxide (CO), and particulate matter (PM_{10} and $PM_{2.5}$) nonattainment areas based on the magnitude of criteria air pollutant exceedances in a given area (42 U.S. Code Section 7401 et seq.). Nonattainment classifications may be used to specify what air pollution reduction measures an area must adopt and when the area must reach attainment. The technical details underlying these classifications are described in the Code of Federal Regulations (CFR) "Protection of Environment" (40 CFR Section 81).

The EPA has established primary and secondary NAAQS for criteria air pollutants. The primary standards are concentrations developed by the EPA through review of extensive scientific research and are intended to be protective against human health impacts. The secondary standards were developed to protect elements of human welfare vulnerable to degraded air quality such as visibility of air, agriculture, buildings, infrastructure, and livestock.

Adverse health impacts associated with exposure to air pollution have varying degrees of severity depending on the receptor (such as, each persons' sensitivity) exposed. For example, infants, children, the elderly, and those with preexisting cardiovascular and respiratory disease (for example, asthma) experience more severe symptoms in response to acute and chronic exposure. However, the EPA has concluded that the current NAAQS protect the public health, including the at-risk populations, with an adequate margin of safety.

In 1959, California enacted legislation requiring the state Department of Public Health to establish air quality standards. California law continues to mandate California ambient air quality standards (CAAQS), which are often more stringent than the NAAQS (CARB, 2021a). The California Air Resources Board (CARB) is responsible for setting standards and adopting regulations to achieve the maximum degree of emissions reduction possible from vehicular and other mobile sources at the state level, as well as for state implementation of the CAA.

Air pollutants come from various sources, both anthropogenic (such as, vehicle exhaust, stationary sources, and operation of mobile equipment in construction and industry) and biogenic (such as, vegetation, animals, and even the earth itself). Exhaust emissions from vehicles vary according to driving speed, type of engine (for example, gasoline or diesel), length of use, and horsepower. Emissions from stationary sources (for example, fossil fuel burning power plants and food processing plants) are estimated by the amount of natural gas and electricity consumption. Construction and industrial equipment generate pollutant emissions that are highly variable by type and technology of specific equipment. Vegetation emits volatile organic compounds (VOCs) which are ozone precursors.

A brief description of each criteria air pollutant (such as, source types, health effects, and future trends) is provided below.

- Ozone:
  Ozone (O_3) is a photochemical oxidant - a substance whose oxygen combines chemically with another substance in the presence of sunlight. In the lower atmosphere, ozone is the primary component of smog. Ozone is not emitted directly into the air but is formed through complex chemical reactions between certain emissions, known as "precursor emissions," in the presence of sunlight. The precursor emissions for ozone are reactive organic gases (ROG) and nitrogen oxides (NO_X). ROGs are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. Common sources of ROG emissions include solvents, pesticides, the burning of fuels, and organic wastes. NO_X is a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels. Common sources of NO_X emissions include emissions from burning of fuel in cars, trucks, buses, power plants, and off-road equipment (EPA, 2018b).

Ozone located in the upper atmosphere (stratosphere) shields the earth from harmful ultraviolet radiation emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. As described below, breathing ozone can trigger a variety of health problems, particularly for children, elderly, and people of all ages who have lung disease (such as, asthma). Ground level ozone can also have harmful effects on sensitive vegetation and ecosystems, including forests, parks, wildlife refuges, and wilderness areas. Ozone can especially cause damage during the growing season (EPA, 2018b).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as people with asthma and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 parts per million (ppm) for one or two hours has been found to substantially alter lung function by increasing respiratory rate and pulmonary resistance, decreasing tidal volume, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to these adverse health effects, ozone exposure can cause an increase in the permeability of respiratory epithelia (such as, the thin tissue forming the outer layer of the body's respiratory system); such increased permeability leads to an increase in the respiratory system's responsiveness to challenges and the inhibition of the immune system's ability to defend against infection (Godish, 2004). These effects may lead to increased school absences, medication use, visits to doctors and emergency rooms, and hospital admissions.

Meteorology and terrain play a major role in ozone formation in the troposphere (such as, at ground level). Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation; therefore, summer generally is the peak ozone season. Peak ozone concentrations often occur far downwind from the precursor emissions due to the time it takes for reactions to complete. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry.

- Carbon Monoxide:
  Carbon monoxide (CO) is a colorless, odorless, and poisonous gas, produced by incomplete burning of carbon in fuels, primarily from internal-combustion engines used for transportation. In fact, 77 percent of nationwide CO emissions are from transportation. The other 23 percent of emissions are from wood-burning stoves, incinerators, and industrial sources.

  CO enters the bloodstream through the lungs by combining with hemoglobin, a component of red blood cells, which normally carries oxygen to the red blood cells. CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include symptoms such as dizziness,

headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA, 2018b).

The highest CO concentrations generally are associated with the cold, stagnant weather conditions that occur in winter. In contrast to ozone, which tends to be a regional pollutant, CO tends to cause localized problems.

- Nitrogen Dioxide**:**
  Nitrogen Dioxide (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and reciprocating internal-combustion engines (mobile as well as stationary). Combustion devices emit primarily nitric oxide (NO), which reacts with oxygen in the atmosphere to form NO_2 (EPA, 2018b). The combined emissions of NO and NO_2 are referred to as NO_X, which is reported as equivalent NO_2. Since NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

  Inhalation is the most common form of exposure to NO_2, with the principal site of toxicity being the lower respiratory tract. The severity of adverse health effects depends primarily on the concentration of NO_2 inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After approximately 4 to 12 hours of exposure, an individual may experience chemical pneumonitis or pulmonary edema, with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment, including symptoms such as chronic bronchitis and decreased lung function.

- Sulfur Dioxide**:** Sulfur dioxide (SO_2) is produced by stationary sources like coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure relate to the upper respiratory tract. SO_2 is a respiratory irritant, with constriction of the bronchioles occurring with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is the most important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis (EPA, 2018b).

- Particulate Matter**:**
  Particulate matter (PM) is a mixture of solid particles and liquid droplets found in air. PM that is small enough to be inhaled has a diameter of 10 microns or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires, natural windblown dust, and can be formed in the atmosphere by condensation or transformation of SO_2 and ROG (EPA, 2018b). $PM_{2.5}$ includes a subgroup of finer particles that have a diameter of 2.5 microns or less.

Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations, and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (EPA, 2018b). The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with adsorption of metals, polycyclic aromatic hydrocarbons, and other toxic substances onto fine particulate matter (referred to as the "piggybacking effect"), or with fine dust particles of silica or asbestos. $PM_{2.5}$ poses an increased health risk when compared to PM_{10} because the particles can deposit deep in the lungs and are more likely to contain substances that are particularly harmful to human health.

- Lead**:**
  Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions historically have been mobile and industrial sources. Due to the phase-out of leaded gasoline, as discussed below, metal processing currently is the primary source of lead emissions. The highest levels of lead in the atmosphere generally are found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturers.

  Twenty years ago, mobile sources (for example, motor vehicles using leaded fuel) were the main contributor to ambient lead concentrations in the air. In the early 1970s, the EPA established national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA, 2018b).

  Due to EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector declined by 95 percent between 1980 and 1999, and levels of lead in the air decreased by 94 percent between 1980 and 1999. Transportation sources, primarily airplanes, now contribute to only 13 percent of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78 percent decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (EPA, 2018b).

  Similarly, lead emissions and ambient lead concentrations have decreased dramatically in California over the past 25 years. The phase-out of lead in gasoline began during the 1970s, and subsequent CARB regulations have eliminated virtually all lead from gasoline now sold in California. All areas of the state currently are designated as attainment for state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. Therefore, CARB has identified lead as a toxic air contaminant (TAC).

Toxic Air Contaminants (TACs)

TACs, referred to at the federal level as hazardous air pollutants (HAPs), are defined as air pollutants that may cause or contribute to an increase in mortality or serious illness or pose a

hazard to human health. TACs usually are present in small quantities in the ambient air. However, in some cases, their high toxicity or health risk may pose a threat to public health even at low concentrations. Of the TACs for which data are available in California, diesel PM, benzene, 1,3- butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, paradichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene pose the greatest risks. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, and genetic damage; or short-term acute effects such as eye watering, respiratory irritation, rhinitis, throat pain, and headaches.

Diesel Particulate Matter (diesel PM):
According to the CARB, the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines (diesel PM) (CARB, 2013). Diesel PM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled, internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present.

Most major sources of diesel emissions, such as ships, trains, and trucks operate in and around ports, rail yards, and heavily traveled roadways. These areas are often located near highly populated areas. Because of this, elevated diesel PM levels are mainly an urban problem, with large numbers of people exposed to higher diesel PM concentrations, resulting in greater health consequences compared to rural areas. A large fraction of personal exposure to diesel PM occurs during travel on roadways. Although Californians spend a relatively small proportion of their time in enclosed vehicles (about 7% for adults and teenagers, and 4% for children under 12), 30 to 55 percent of total daily diesel PM exposure typically occurs during the time people spend in motor vehicles (CARB, 2021e).

Statewide, diesel PM emissions account for approximately two percent of the annual average for on-road emissions, while other diesel PM emissions from offroad mobile sources (for example, construction and agricultural equipment) account for an additional three percent (CARB, 2013). Statewide diesel PM emissions decreased approximately 37 percent from year 2000 to 2010, primarily from implementation of more stringent federal emission standards and cleaner burning diesel fuel (CARB, 2013). CARB anticipates that diesel PM emissions from onroad and other mobile sources (for example, construction and agricultural equipment) will continue to decrease into 2035. This decrease would also be attributed to more stringent emissions standards and the introduction of cleaner burning diesel fuel.

Naturally occurring asbestos:
Naturally occurring asbestos, which was identified as a TAC in 1986 by CARB, is located in the existing geology in many parts of California. According to the United States Geological Survey (USGS) and the Department of Conservation, Division of Mines and Geology, the geology of California has been extensively investigated. The USGS has published mapping identifying areas that are known to contain naturally occurring asbestos (NOA) (USGS, 2011). The mapping indicates that there are several locations within Humboldt County that are known to contain NOA. The project site is located in the Mad River Valley and is not identified as being in close proximity to areas that contain NOA. The closest areas containing NOA are located in inland areas of the County over 10 miles to the east of the project site (USGS, 2011).

California Air Resources Board

In California, the CARB, which is part of the California Environmental Protection Agency, is responsible for meeting the State requirements of the federal CAA, administering the California Clean Air Act, and establishing the CAAQS. The California Clean Air Act, as amended in 1992, requires all 35 air districts in the state to endeavor to achieve and maintain the CAAQS. The CARB regulates mobile air pollution sources, such as motor vehicles. It is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. The CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

In-Use Off-Road Diesel-Fueled Fleets Regulation:

The off-road equipment fleet at the Royal Gold facility (front-end loaders, skid steer, mini-excavator, and one forklift) is subject to the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation (Off-Road Regulation) (CARB, 2021c). The Off-Road Regulation applies to all self-propelled off-road diesel vehicles 25 horsepower or greater used in California and most two-engine vehicles, and includes rented or leased vehicles. The goal of the state's Off-Road Regulation is to reduce particulate matter (PM) and oxides of nitrogen (NOx) emissions from in-use (such as, existing) off-road heavy-duty diesel vehicles.

Large Spark Ignition (LSI) Engine Fleet Requirements:

Most of the forklifts at the Royal Gold facility are subject to the CARB Large Spark Ignition (LSI) Engine Fleet Requirements Regulation (CARB, 2021d). The LSI regulation requires operators of in-use fleets to achieve specific hydrocarbon (HC) + oxides of nitrogen (NOx) fleet average emission level standards. Royal Gold must submit information about its equipment and vehicles that are subject to these regulations through the DOORS system (ID: 161236) (CARB, 2020), which is an on-line tool designed to help fleet owners report to CARB equipment inventories and actions taken to reduce emissions.

North Coast Unified Air Quality Management District (NCUAQMD)

The North Coast Unified Air Quality Management District (NCUAQMD), one of 35 air districts in California, has jurisdiction over Humboldt, Del Norte, and Trinity counties. The NCUAQMD's primary responsibility is for controlling air pollution from stationary sources and is committed to achieving and maintaining healthful air quality throughout the tri-county jurisdiction. The NCUAQMD has permit authority over most types of stationary emission sources and can require stationary sources to obtain permits, impose emission limits, set fuel or material specifications, or establish operational limits to reduce air emissions. The NCUAQMD monitors air quality, enforces local, State and federal air quality regulations for counties within its jurisdiction, inventories and assesses the health risks of TACs, and adopts rules that limit pollution.

Particulate Matter (PM10) Attainment Plan:

As noted previously, the NCUAQMD is listed as "attainment" or "unclassified" for all the federal and State ambient air quality standards except for the state 24-hour particulate matter (PM_{10}) standard. In 1995, the Air District provided a study to identify the contributors of PM_{10} which is summarized in the Particulate Matter PM_{10} Attainment Plan Draft Report (1995). This report

includes a description of the planning area (North Coast Unified Air District), an emissions inventory, general attainment goals, and a listing of cost-effective control strategies. The NCUAQMD's Attainment Plan established goals to reduce PM_{10} emissions and eliminate the number of days in which standards are exceeded. The Attainment Plan includes three areas of recommended control strategies to meet these goals: transportation, land use, and burning.

Permit to Operate:
Royal Gold has a facility-wide Permit to Operate (No. NCU 472-12) from the NCUAQMD for the horizontal grinder and two soil/mixing bagging lines (NCUAQMD, 2020a). Royal Gold also has a Permit to Operate (No. 001115-2) for the portable diesel-powered trommel screener (NCUAQMD, 2020b). These permits from the NCUAQMD contain specific operational conditions and emissions limitations to ensure the equipment does not exceed the air quality standards of the federal and state Clean Air Acts, California Health and Safety Code, and the Rules and Regulations of the NCUAQMD (NCUAQMD, 2015).

Facility Dust Mitigation and Housekeeping Plan:
Activities at the Royal Gold facility are required to meet NCUAQMD Rule 104 - Prohibitions, which bans nuisance dust generation and is enforceable by the NCUAQMD. Rule 104 states that "*reasonable precautions shall be taken to prevent particulate matter from becoming airborne*." To minimize impacts from fugitive dust generation from facility operations, the NCUAQMD required Royal Gold to prepare and implement a Facility Dust Mitigation and Housekeeping Plan (see Appendix 5.2; Royal Gold, LLC, 2020a). The Plan is periodically updated to reflect current operational conditions.

Significance Thresholds

As noted above, the project is located in the NCAB and is within the NCUAQMD. In determining whether a project has significant air quality impacts on the environment, it is customary to apply the local air district's thresholds of significance to projects in the environmental review process. Humboldt County is listed as in "attainment" or "unclassified" for all the federal and state ambient air quality standards except for the state 24-hour particulate matter (PM_{10}) standard, and the NCUAQMD has not adopted CEQA significance thresholds for project-level review for land use projects.

For the purposes of assessing air quality impacts in CEQA documents, NCUAQMD Rule 110 – New Source Review (NSR) And Prevention of Significant Deterioration (PSD), which contains thresholds for operational emissions from new stationary sources, is commonly used as a significance threshold for project-level review for land use projects. Although these stationary source emissions thresholds do not directly apply to land use projects, they provide a reference point for levels of emissions that would trigger NCUAQMD requirements for best available control technology and/or mitigation off-sets. Per Rule 110, criteria air pollutants from the operation of stationary sources are considered significant if they exceed the following thresholds listed in Table 2 (NCUAQMD, 2015).

Table 2: NCUAQMD Significance Thresholds[1]

Pollutant	Significance Thresholds	
	Daily (pounds per day)	Annual (tons per year)
Reactive Organic Compounds	50	40
Nitrogen Oxides	50	40
Carbon Monoxide	500	100
Sulfur Oxides	80	40
Particulate Matter (PM10)	80	15
Particulate Matter (PM2.5)	50	10
1. NCUAQMD, 2015		

In using NCUAQMD Rule 110 as a threshold in this document, the Lead Agency is exercising its discretion to formulate localized CEQA significance criteria based in part on the NCUAQMD rules, as they reflect the best available expert judgment regarding what constitutes significant levels of air pollution within the regional air basin that includes Humboldt County.

Analysis:

a) *Conflict with or obstruct implementation of the applicable air quality plan?*
Less-than-significant with Mitigation Incorporated.

The project is located in Humboldt County, which is located in the NCAB and is subject to the jurisdiction of the NCUAQMD. The NCUAQMD's primary responsibility is to achieve and maintain federal and State air quality standards, subject to the powers and duties of the CARB. As noted in the Setting, Humboldt County is listed as being in "attainment" or "unclassified" for all the federal and state ambient air quality standards except for the state 24-hour particulate matter (PM_{10}) standard in Humboldt County only (NCUAQMD, 2021).

As discussed in the Setting, the NCUAQMD prepared a Draft Particulate Matter (PM_{10}) Attainment Plan in May 1995 (NCUAQMD, 1995). The Attainment Plan includes a description of the planning area, an emissions inventory, general attainment goals, and a listing of cost-effective control strategies. The Attainment Plan established goals to reduce PM_{10} emissions and eliminate the number of days in which standards are exceeded. The Attainment Plan includes three areas of recommended control strategies to meet these goals: transportation, land use, and burning. A potentially significant impact to air quality would occur if the project would conflict with or obstruct the implementation of the NCUAQMD PM_{10} Attainment Plan.

Construction
Construction of the proposed project will include ground-disturbing activities (for example, site preparation, grading, trenching, etc.) that have the potential to temporarily contribute to PM_{10} concentrations, primarily from fugitive dust generation and vehicle/equipment exhaust. Activities at the Royal Gold operation are required to meet NCUAQMD Rule 104 - Prohibitions, which bans nuisance dust generation and is enforceable by the NCUAQMD. Rule 104 states that "*reasonable precautions shall be taken to prevent particulate matter from becoming airborne*."

To minimize impacts from fugitive dust generation associated with operation of the Royal Gold facility, the NCUAQMD required Royal Gold to prepare and implement a Facility Dust Mitigation and Housekeeping Plan (see Appendix 5.2; Royal Gold, 2020a). The Plan includes dust control measures that are commonly implemented to reduce fugitive dust generation during construction activities such as periodic watering of work areas and access roads, clean-up of soil material with street sweepers, covering material stockpiles with tarps, and suspending operational activities during high winds. As such, the implementation of this Plan will be equally effective during construction activity as it is during typical operations at the Royal Gold facility. To reduce fugitive dust generation during construction activity, compliance with the Facility Dust Mitigation and Housekeeping Plan has been included as Mitigation Measure AQ-1 for the proposed project. Due to the temporary nature of the proposed construction activity and the incorporation of Mitigation Measure AQ-1, the proposed project's construction activity would not conflict with or obstruct implementation of the PM_{10} Attainment Plan.

Operation

The NCUAQMD Particulate Matter (PM_{10}) Attainment Plan includes three areas of recommended control strategies to achieve attainment status: transportation, land use, and burning. The project aligns with control measures identified in the PM_{10} Attainment Plan appropriate to this type of project, such as:

Transportation:

As discussed in the Attainment Plan, stop-and-go traffic accounts for a large portion of vehicular related PM_{10} emissions. This is especially true with heavy duty diesel fueled vehicles (NCUAQMD, 1995). The project site is located nearby to highway access and is within approximately 500 feet of Highway 299 and approximately seven miles from Highway 101. The project site was historically used for lumber milling and was designed to allow for the smooth flow of truck traffic through the site. The close proximity to the highway and the design of the site minimizes stop-and-go traffic for haul trucks and reduces potential vehicular PM_{10} emissions.

Land Use:

The project is located in the unincorporated community of Glendale on an infill development site that has been used for industrial purposes since the 1950s and would continue to function as such under the proposed project. The location of an industrial operation on a historic industrial site near the population centers in the Humboldt Bay area, has the potential to reduce vehicle miles traveled and associated vehicular emissions for employees that would have potentially traveled longer distances for similar employment opportunities.

Burning:

The project does not propose the burning of materials as a consistent part of operations or the use of structural heating sources such as woodstoves or fireplaces, which will minimize associated PM_{10} emissions generated during long-term operation of the project.

Fugitive Dust:

In addition to the Attainment Plan control measures discussed above, there is also the potential for PM_{10} emissions in the form of fugitive dust during operation of the proposed project. The potential for fugitive dust would primarily occur from raw material processing

and handling activities and bulk soil production. To minimize impacts from fugitive dust generation during facility operations, the NCUAQMD required Royal Gold to prepare and implement a Facility Dust Mitigation and Housekeeping Plan (see Appendix 5.2; Royal Gold, 2020a). To ensure the Plan is properly implemented, several members of the facility maintenance crew are tasked with addressing fugitive dust. Additionally, all Royal Gold staff are expected to assist with control measures if fugitive dust issues occur at the site. Some of the minimization measures in the Plan include, but are not limited to, periodic watering of work areas and access roads, clean-up of soil material with street sweepers, covering material stockpiles with tarps, wetting of soil materials prior to processing, hanging geotextile nylon screens (60% shade, fabric weave shade cloth) on the open sides of pole-shed-type structures at the site, and suspending operational activities during high winds. The Plan is periodically updated to reflect current operational conditions. Compliance with the Facility Dust Mitigation and Housekeeping Plan has been included as Mitigation Measure AQ-1 for the proposed project. With the incorporation of Mitigation Measure AQ-1, the proposed project's operation will not conflict with or obstruct implementation of the PM_{10} Attainment Plan.

Based on the location and design of the project and implementation of Mitigation Measure AQ-1, the proposed project would not conflict with or obstruct implementation of the NCUAQMD PM_{10} Attainment Plan. Therefore, it is reasonable to conclude that with incorporation of mitigation the proposed project would result in a less than significant impact with respect to this potential issue.

b) *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?*
Less-than-significant Impact.

As described in the above regulatory setting discussion, the project is located in Humboldt County, which is part of the North Coast Air Basin (NCAB) and is subject to the jurisdiction of the NCUAQMD. The NCUAQMD's primary responsibility is to achieve and maintain federal and State air quality standards, subject to the powers and duties of the CARB. Humboldt County is listed as being in "attainment" or "unclassified" for all the federal and state ambient air quality standards except for the state 24-hour particulate matter (PM_{10}) standard (NCUAQMD, 2021).

The proposed project has the potential to generate PM_{10} emissions during both construction and operation. During construction activities, PM_{10} emissions would primarily be generated from fugitive dust from ground-disturbing activities and vehicle/equipment exhaust. During operation of the proposed project, PM_{10} emissions would primarily be generated from activities with the potential to generate fugitive dust (for example, raw material processing and handling activities, bulk soil production, use of unpaved access roads, etc.) and vehicle/equipment exhaust.

Both construction and operational emissions for the proposed project were estimated using the California Emissions Estimator Model (CalEEMod) (see Appendix 5.3; CAPCOA,

2020), which is a statewide land use emissions computer model designed to provide a uniform platform for government agencies to quantify potential criteria pollutant emissions associated with both construction and operation of a variety of land use projects (see Appendix 5.3; CAPCOA, 2020). The model applies inherent default values for various land uses, including trip generation rates based on the Institute of Transportation Engineers (ITE) Manual, vehicle mix, trip length, average speed, etc. However, where project-specific data is available, such data should be input into the model. Project-specific information from the Plan of Operations (see Appendix 5.1; Royal Gold, 2021), where available, was input into the model. Otherwise, where project-specific information was not available, the model default values were used for estimating emissions from the project. Due to the PM_{10} non-attainment status for Humboldt County, PM_{10} is the primary focus of the emissions estimates and analysis in this section. For information purposes only, emissions estimates are also provided for other common air pollutants including ROG, CO, NOx, SOx, and $PM_{2.5}$.

Table 3 and 4 below provide the maximum daily construction and operations emissions estimates (unmitigated) from CalEEMod as compared to the significance threshold for PM_{10} in NCUAQMD Rule 110. As discussed in the Setting, although not directly applicable to land use projects, the Rule 110 significance thresholds provide a reference point for levels of emissions that would trigger requirements for best available control technology and/or mitigation off-sets. As such, these thresholds reflect the best available expert judgment regarding what constitutes significant levels of air pollution within the NCAB and Humboldt County. For the purposes of this analysis, PM_{10} emissions from construction and operation of the proposed project would be cumulatively considerable if they exceed the Rule 110 significance threshold (NCUAQMD, 2015).

Table 3: Maximum Daily Construction Emissions (Unmitigated)

Criteria Pollutants	Emissions (pounds per day)					
	ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions[1]	19.7	49.1	40.3	0.1	20.7	11.6
Significance Threshold[2]	50	50	500	80	80	50
Exceeds Significance Threshold?	No	No	No	No	No	No
1. Appendix 5.3; CAPCOA, 2020 2. NCUAQMD, 2015						

Table 4: Maximum Daily Operational Emissions (Unmitigated)

Criteria Pollutants	Emissions (pounds per day)					
	ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions[1]	5.1	1.9	8.8	<0.1	1.6	0.4
Significance Threshold[2]	50	50	500	80	80	50
Exceeds Significance Threshold?	No	No	No	No	No	No
1. Appendix 5.3; CAPCOA, 2020 2. NCUAQMD, 2015						

As indicated in Tables 3 and 4, the maximum daily construction and operational emissions from the proposed project would be below the NCUAQMD Rule 110 significance threshold for PM_{10}. Additionally, the construction and operation of the proposed project would not exceed the significance thresholds for ROG, CO, NOx, SOx, and $PM_{2.5}$. As such, the proposed project is not anticipated to result in a cumulatively considerable net increase of PM_{10}.

Therefore, the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the NCUAQMD is non-attainment under an applicable federal or State ambient air quality standard.

c) *Expose sensitive receptors to substantial pollutant concentrations?*
Less-than-significant with Mitigation Incorporated.

As noted earlier in the Regulatory Setting discussion, high concentrations of criteria air pollutants and toxic air contaminants can result in adverse health effects to humans. Sensitive receptors (for example, children, senior citizens, and acutely or chronically ill people) are more susceptible to the effect of air pollution than the general population. Land uses that are considered sensitive receptors typically include residences, schools, parks, childcare centers, hospitals, and retirement homes. There are no schools, parks, childcare centers, hospitals, or retirements homes in the vicinity of the project site. The nearest school is approximately 1.6 miles to the southeast (Blue Lake Elementary School). The nearest park is approximately 1.7 miles to the southeast (Perigot Park). There are residential properties located surrounding the Royal Gold facility. The closest residences to active areas at the facility are located to the west, south, and north of the southwest portion of the site adjacent to APNs 516-101-079, -083. The closest residence to the west is within approximately 40 feet of the western boundary of APN 516-101-083. The closest residence to the south is within approximately 90 feet of the southern boundary of APN 516-101-079. The closest residence to the north is located on a bluff above the project site and is within 120 feet of the northern boundary of APN 516-101-083 (see Figure 2 – Project Area, Figure 3 – Assessor Parcel Numbers, and Figure 6 – Site Plan).

The NCUAQMD has not adopted guidance for health risk assessments or health risk significance thresholds. However, on the NCUAQMD's website ("Air Quality Planning & CEQA" section), the District recommends the use of the California Air Pollution Control Officers Association (CAPCOA) guidance document entitled "Health Risk Assessment for Proposed Land Use Projects" to assist lead agencies with the requirements of CEQA when projects may involve exposure to toxic air contaminants. The document primarily focuses on addressing long-term public health risk impacts from and to proposed land use projects. The document does not provide guidance on how risk assessments for construction projects should be addressed in CEQA (CAPCO, 2009).

Air quality issues occur when sources of air pollutants and sensitive receptors are located near one another. As discussed in the CAPCOA guidance document (CAPCOA, 2009), there are basically two types of land use projects that have the potential to cause long-term public health risk impacts:

- Land use projects with toxic emissions that impact receptors. Examples of these types of projects include combustion-related power plants, gasoline dispensing facilities, asphalt batch plants, warehouse distribution centers, and quarry operations.

- Land use projects that will place receptors in the vicinity of existing toxic sources. This would occur when residential, commercial, or institutional developments are proposed to be located in the vicinity of existing toxic emission sources such as stationary sources, high traffic roads, freeways, rail yards, and ports.

The proposed project is a type of land use project with emissions that have the potential to impact sensitive receptors. The following analysis evaluates whether the proposed project would result in construction or operational-related impacts to sensitive receptors. Analysis distinguishes between construction and daily operational activities with separate discussion of each.

Construction

This discussion addresses whether the construction activities proposed by the project would expose sensitive receptors to asbestos, fugitive dust (PM_{10} and $PM_{2.5}$), and diesel particulate matter (diesel PM).

Asbestos:

The USGS has published mapping identifying areas that are known to contain Naturally Occurring Asbestos (NOA) (USGS, 2011). The mapping indicates that there are several locations within Humboldt County that are known to contain NOA. The project site is located in the Mad River Valley and is not identified as being in close proximity to areas that contain NOA. The closest areas known to contain NOA are located in inland areas of the County over 10 miles to the east of the project site (USGS, 2011). As such, the project site is not known to contain NOA that could be released during construction activities such as site preparation, grading, and trenching. The project does not propose the demolition of any remnant structures from the former lumber mill that potentially contain asbestos materials. A variety of materials are imported to the site for use and mixing in the soil manufacturing process, including coco pith, sawdust, compost, chicken manure, and fish bone, peat moss, organic compost, and amendments. Other imported materials include perlite and lava rock. Asbestos is most commonly found in three rock types: serpentinites, altered ultramafic rocks, and some mafic rocks. None of these materials are known to contain asbestos.

Fugitive Dust:

Fugitive dust has the potential to be generated during construction from ground-disturbing activities including site preparation, grading, and trenching. As discussed in the analysis under subsection b) above, the proposed project would not exceed any of the NCUAQMD significance thresholds for particulate matter (for example, PM_{10} and $PM_{2.5}$). However, fugitive dust from construction activity can still result in nuisances and localized health impacts. Fugitive dust emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Fugitive dust emissions would also depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating.

As discussed in subsection a) above, to minimize impacts from fugitive dust generation during facility operations, the NCUAQMD required Royal Gold to prepare and implement a Facility Dust Mitigation and Housekeeping Plan (see Appendix 5.2; Royal Gold, 2020a). The Plan includes dust control measures that are commonly implemented to reduce fugitive dust generation during construction activities such as periodic watering of work areas and access roads, clean-up of soil material with street sweepers, covering material stockpiles with tarps, and suspending operational activities during high winds. As such, the implementation of this Plan will be equally effective during construction activity as it is during typical operations at the Royal Gold facility. To reduce fugitive dust generation during construction activity, compliance with the Facility Dust Mitigation and Housekeeping Plan has been included as Mitigation Measure AQ-1 for the proposed project. Due to the temporary nature of the proposed construction activity and the incorporation of Mitigation Measure AQ-1, the proposed project's construction activity would not expose sensitive receptors to substantial fugitive dust concentrations.

Diesel Particulate Matter (diesel PM):
The use of diesel-powered equipment during construction activity would generate diesel particulate matter (diesel PM), which is a known carcinogen. The majority of heavy diesel equipment used during construction activity would occur during ground-disturbing activities (for example, site preparation, grading, and trenching).

Due to the limited scale and duration of construction activities, and the rapid dissipation of diesel PM with distance, it is not anticipated that sensitive receptors would be exposed to substantial diesel PM concentrations. Based on the emissions modeling conducted for the project, maximum daily emissions of diesel PM (modeled by $PM_{2.5}$, which is conservatively considered a surrogate for diesel PM), would not exceed 12 pounds per day for all construction activities, combined (see Appendix 5.3; CAPCOA, 2020). This is well below the NCUAQMD significance threshold of 50 pounds per day. This maximum daily emission level represents all construction activities; however, individual site improvements would result individually in less emissions. Thus, due to the dispersive properties of diesel PM, concentrations from individual site improvements would be lower, resulting in less exposure to any one receptor.

It should be noted that for the purposes of calculating construction emissions, the model default construction schedule conservatively assumed that all the proposed improvements would be constructed over an 18-month period from May 2022 to November 2023. Although phasing of the improvements may occur, this assumption provides a worst-case scenario for construction emissions. As such, the emissions of criteria air pollutants that would occur from project construction activities would most likely be less than indicated in the modeling results since they would be spread out over a longer period.

Construction activities would occur for brief periods of time for each proposed site improvement. Residents located within the vicinity of the project site would be exposed to construction contaminants only for the duration of construction activity. These brief exposure periods would substantially limit exposure to hazardous emissions. Therefore, it is not anticipated that the proposed project's construction activity would expose sensitive receptors to substantial diesel PM concentrations.

Operation
This discussion addresses whether operational activities proposed by the project would expose sensitive receptors to fugitive dust (PM_{10} and $PM_{2.5}$) and diesel particulate matter (diesel PM). These activities are viewed as both daily and ongoing.

Fugitive Dust:
Operational activities at the Royal Gold facility are required to meet NCUAQMD Rule 104 - Prohibitions, which bans nuisance dust generation and is enforceable by the NCUAQMD. Rule 104 states that "*reasonable precautions shall be taken to prevent particulate matter from becoming airborne*." As discussed under subsection a) above, to minimize impacts from fugitive dust generation during facility operations, the NCUAQMD required Royal Gold to prepare and implement a Facility Dust Mitigation and Housekeeping Plan (see Appendix 5.2; Royal Gold, 2020a). To ensure the Plan is properly implemented, several members of the facility maintenance crew are tasked with addressing fugitive dust. Additionally, all Royal Gold staff are expected to assist with control measures if fugitive dust issues occur at the site. Some of the minimization measures in the Plan include, but are not limited to, periodic watering of work areas and access roads, clean-up of soil material with street sweepers, covering material stockpiles with tarps, wetting of soil materials prior to processing, hanging geotextile nylon screens (60% shade, fabric weave shade cloth) on the open sides of pole-shed-type structures at the site, and suspending operational activities during high winds. The Plan is periodically updated to reflect current operational conditions. Compliance with the Facility Dust Mitigation and Housekeeping Plan has been included as Mitigation Measure AQ-1 for the proposed project. With the incorporation of Mitigation Measure AQ-1, the project will not expose sensitive receptors to substantial pollutant concentrations.

Diesel Particulate Matter (diesel PM):
The use of diesel-powered equipment and vehicles during operational activity would generate diesel particulate matter (diesel PM), which is a known carcinogen. Royal Gold uses both stationary and mobile diesel-powered equipment and vehicles during facility operations. Stationary diesel-powered equipment includes a horizontal grinder and two soil/mixing bagging lines. Royal Gold also has a portable diesel-powered trommel screener. Mobile equipment/vehicles include, but are not limited to, front-end loaders, dump trucks, forklifts, generators, mini-excavator, and hauling trucks. As discussed in the Setting, the stationary and mobile equipment at the Royal Gold facility is subject to the emissions regulations of the NCUAQMD and CARB.

The NCUAQMD's primary responsibility is for controlling air pollution from stationary sources and is committed to achieving and maintaining healthful air quality throughout the tri-county jurisdiction (Humboldt, Del Norte, and Trinity counties). The NCUAQMD has permit authority over most types of stationary emission sources and can require stationary sources to obtain permits, impose emission limits, set fuel or material specifications, or establish operational limits to reduce air emissions. As discussed in the Setting, Royal Gold has a facility-wide Permit to Operate (No. NCU 472-12) from the NCUAQMD for the horizontal grinder and two soil/mixing bagging lines (NCUAQMD, 2020a). Royal Gold also has a Permit to Operate (No. 001115-2) for the portable diesel-powered trommel screener (NCUAQMD, 2020b). These permits from the NCUAQMD contain specific operational conditions and emissions limitations to ensure the equipment does not exceed the air quality

standards of the federal and state Clean Air Acts, California Health and Safety Code, and the Rules and Regulations of the NCUAQMD (NCUAQMD, 2015).

The CARB regulates mobile air pollution sources, such as motor vehicles. It is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. The CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level. As discussed in the Setting, the off-road equipment fleet at the Royal Gold facility (front-end loaders, skid steer, mini-excavator, and one forklift) is subject to the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation (Off-Road Regulation; CARB, 2021c). The Off-Road Regulation applies to all self-propelled off-road diesel vehicles 25 horsepower or greater used in California and most two-engine vehicles, and includes rented or leased vehicles. The goal of the state's Off-Road Regulation is to reduce particulate matter (PM) and oxides of nitrogen (NOx) emissions from in-use (such as, existing) off-road heavy-duty diesel vehicles.

Based on the emissions modeling conducted for the project, maximum daily emissions of diesel PM (modeled by $PM_{2.5}$, which is conservatively considered a surrogate for diesel PM), would not exceed 1 pound per day for all operational activities, combined (see Appendix 5.3; CAPCOA, 2020). This is well below the NCUAQMD significance threshold of 50 pounds per day. Even if the operational activities were assumed to produce diesel PM emissions more similar to construction activity (up to 12 pounds per day), they would still be well below the NCUAQMD significance threshold. This maximum daily emission level represents all operational activities; however, individual activities would take place at several locations on the 34-acre facility and would result individually in less emissions. Thus, concentrations from individual site activities would be lower, resulting in less exposure to any one receptor. Even during the most intensive operational activities, there would not be substantial diesel PM concentrations, because of the distribution of activities throughout the facility and the rapid dissipation of diesel PM with distance. As such, no single receptor would be exposed to substantial operational-related emissions of diesel PM for extended periods of time. Therefore, it is not anticipated that operation of the proposed project would expose sensitive receptors to substantial diesel PM concentrations.

Conclusion
The construction and operational activities proposed by the project, as mitigated and in compliance with permit conditions and regulatory requirements, would not expose sensitive receptors to substantial pollutant concentrations. Therefore, the proposed project would result in a less than significant impact with mitigation incorporated on this category of environmental effect.

d) *Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?*
Less-than-significant with Mitigation Incorporated.

The potential for the project to generate emissions of criteria air pollutants and TACs is addressed under subsections a) – c) above. Some of the emissions that would be generated during both construction and operation also have the potential to generate odors. In addition,

some of the materials that are processed/handled at the Royal Gold facility have the potential to generate odors (for example, compost and softwood sawdust). There is also the potential for odors from the coconut fiber process water at the facility. The discussion below analyzes whether the potential odors from the proposed project would adversely affect a substantial number of people.

Construction

During construction, there is the potential for the generation of objectionable odors in the form of equipment/vehicle exhaust and volatile organic compounds (from architectural coatings) in the immediate vicinity of the proposed site improvements. Based on the location of the proposed site improvements in the central and northern portions of the site, the short-term nature of construction activity, and the rapid dispersal of these emissions with distance, it is not anticipated the potential odors would adversely affect a substantial number of people.

Operation

During project operation, there is the potential for the generation of objectionable odors in the form of exhaust from stationary and mobile equipment and vehicles in the immediate vicinity of equipment/vehicle activity. Additionally, some of the materials that are processed/handled at the Royal Gold facility (for example, compost and softwood sawdust) have the potential to generate odors. There is also the potential for odors from the coconut fiber process water at the facility.

As discussed under subsection c), operational activities will be dispersed throughout the 34-acre facility, which reduces the exposure to equipment/vehicle exhaust odors for any one receptor. Additionally, exhaust emissions rapidly disperse with distance. Although, surrounding receptors may periodically experience odors, equipment/vehicle exhaust from project operations is not anticipated to adversely affect a substantial number of people.

Pursuant to 14 CCR §17852 and §17856, regulations of the California Department of Resources, Recycling, and Recovery (CalRecycle), Royal Gold is defined as an Agricultural Material Composting Operation that is required to submit a notification to the Local Enforcement Agency (LEA) (which is the Humboldt County Division of Environmental Health). Royal Gold submitted the notification in 2014 to the LEA for the handling of commercially-produced compost and softwood sawdust as part of its soil production activities (HCDEH, 2014). Due to the potential for these materials to generate odors that could impact surrounding sensitive receptors (for example, residences), the LEA required Royal Gold to prepare an Odor Impact Minimization Plan (OIMP or Plan) (see Appendix 5.4; Royal Gold, 2020b). The OIMP was prepared pursuant to the requirements of CalRecycle in 14 CCR §17863.4. To ensure the Plan is properly implemented, Royal Gold has trained several members of its facility maintenance crew in the protocols for odor complaint response and odor reduction measures. Additionally, all Royal Gold staff are expected to assist with control measures if odor issues occur at the site. Some of the minimization measures in the Plan include, but are not limited to, daily site assessment for potential odor impacts, monitoring of stockpile moisture and temperature, and turning and hydrating stockpiles as needed. The Plan is periodically updated to reflect current operational conditions. Implementation of the OIMP is included as Mitigation Measure AQ-2 for the proposed project. With the incorporation of Mitigation Measure AQ-2, the

processing/handling of materials at the Royal Gold facility would not create objectionable odors affecting a substantial number of people.

As part of the processing of coconut fiber at the facility, the compressed bricks of fiber are rehydrated, which generates process water. The process water is stored in lined ponds in the central part of the facility adjacent to Building A before being piped to a sediment filter in the southwestern portion of the site. After the separation of solids from the process water, the water is discharged to the sewer system per the requirements of the Wastewater Discharge Permit (#2020-01) from the Fieldbrook-Glendale Community Services District. If not properly managed, the process water has the potential to generate odors. Odor control measures implemented by Royal Gold to address potential odors include, but are not limited to, aeration of the lined ponds and flushing of the piping with freshwater. With current procedures and infrastructure, it is not anticipated that the coconut fiber process water at the Royal Gold facility would result in objectionable odors affecting a substantial number of people.

Conclusion
The construction and operational activities proposed by the project, as designed, mitigated, and in compliance with permit conditions and regulatory requirements, would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. Therefore, it ss reasonable to conclude that with incorporation of mitigation, the proposed project would result in a less than significant impact with respect to this potential issue.

Mitigation Measures:

AQ-1. Facility Dust Mitigation and Housekeeping Plan: As detailed in the Facility Dust Mitigation and Housekeeping Plan for NCUAQMD Permit to Operate (FID #472-12), Royal Gold will implement the following measures to minimize nuisance dust generation:

1. Track-out onto the paved public road

The following measures to minimize dust generation from track-out onto Glendale Drive shall be adhered to including:

a) Any visible track-out onto Glendale Drive shall be removed as needed using one of several street sweepers. A log of all street sweeper activity will be kept onsite.

b) To minimize dust and/or track-out of materials, the entrances/exits for the facility are paved from their intersections with Glendale Drive to the following distances into the site:

- The main entrance/exit at the site on APN 516-101-008 has pavement extending approximately 300 feet from the intersection with Glendale Drive.
- The exit from the site on APN 516-101-079 has pavement extending approximately 80 feet from the intersection with Glendale Drive.

- The exit at the site on APN 516-111-062 has pavement extending approximately 70 feet from the intersection with Glendale Drive.

2. Active Storage Piles

a) Active material stockpiles are kept tarped except during the addition and removal of material to minimize dust generation whenever feasible.

b) Active material stockpiles for the bagging lines are kept in concrete bins, under the cover of the pole-shed buildings or be tarped daily.

3. Exposed Areas and Inactive Stockpiles

The following measures to minimize dust generation from exposed areas, inactive stockpiles, or soil materials shall be adhered to including:

a) Periodic watering of the access roads and work areas during activity at the site shall occur to reduce fugitive dust emissions. During project operations, two water trucks are used for watering the access roads and work areas as needed. Manual hose watering of work areas also occurs as needed during times of peak activity.

b) Inactive material stockpiles shall be adequately wetted, covered with tarps, and/or placed under covered structures to minimize dust generation.

c) When wind speeds exceed 15 m.p.h. and result in dust emissions crossing the property line, activities shall be suspended until the area is adequately wetted.

d) Wood particles or other similar materials deposited on the roof of any buildings, on the ground, or elsewhere shall be removed or controlled as soon as practicable. A street sweeper is used to increase the efficiency of collecting the material.

e) Daily logs will be kept onsite documenting all dust mitigation activities including the application of water and sweeping of fugitive soil material.

f) Metal walls have been installed on the southern and eastern sides of the compost storage building on APNs 516-101-060 and 516-111-063 to limit wind exposure and minimize dust generation.

g) No stockpiles will be stored in the southeast portion of the facility, as delineated on the Facility Site Plan, to minimize dust from escaping offsite to the south and east.

4. Traffic on Onsite Unpaved Roads, Parking Lots, and Staging Areas

The following measures to minimize dust generation from traffic on onsite unpaved roads, parking lots, and staging areas shall be adhered to including:

a) Equipment and vehicles/trucks on site shall be required to maintain a maximum 10 m.p.h. speed limit. Speed limits are posted onsite in several locations.

b) Equipment and vehicle/truck traffic on site shall be restricted to roads, parking lots, and staging areas that are either:

1) Adequately wetted (such as sufficiently mixed or penetrated with liquid to prevent the release of particulates);
2) Maintained with a minimum 3" gravel coating of less than 5% silt content and 0.10% NOA content;
3) Coated with a chemical dust suppressant such as lignin or magnesium chloride; or
4) Paved.

5. Earth Moving Activities

The project does not typically involve earth moving activities including quarrying, excavation, or grading. When grading or excavation is proposed for the installation of storage buildings, utilities, stormwater improvements and maintenance, access road maintenance, landscaping, etc., the following measures shall be adhered to including:

a) Pre-wetting the ground to the depth of anticipated cuts during dry months.
b) Application of water prior to any land clearing.
c) Suspending grading operations during dry months when wind speeds are high enough to result in dust emissions crossing the property line.
d) All dust mitigation activities including the application of water and the suspension of grading activities will be documented and records will be kept onsite.

6. Offsite Transport

The offsite transport of packaged and palletized soil material generates minimal dust. During the offsite transport of bulk soil material using open bodied trucks, the following measures shall be adhered to including:

a) Loads shall maintain adequate moisture content before and during loading.
b) Loads shall be covered with tarps.

7. Material Handling/Processing

Processing equipment used at the Royal Gold facility includes a horizontal grinder, screener, bale buster, and soil mixing/bagging lines. To minimize dust generation during processing activities, the following measures are adhered to including:

<u>Grinder</u> (CMI Biogrind 175)

a) The grinder is operated under covered buildings to limit wind exposure.
b) All materials processed with the grinder are adequately wetted prior to processing.
c) The grinder is equipped with water spray bars.
d) To minimize dust from escaping from the grinder area, geotextile nylon screens are hung from the structures where grinding occurs.

Screener (Terex Phoenix 2100)

a) The trommel screener will be located a minimum of 300 feet from the nearest residential property line to minimize dust from escaping offsite.

b) A fabricated shroud has been placed on the end of the screener to direct dust and materials downward.

c) The belt on the screener has been lowered so materials do not fall as far before reaching the finished stockpile.

Bale Buster (Kase Gobbler Model #3561)

a) The bale buster is operated in a covered, enclosed building on APNs 516-111-062 and -063 (see Facility Site Plan).

Soil Mixing/Bagging Lines (Bouldin & Lawson mixing lines, Bouldin & Lawson and Premier Bagging Lines)

a) The soil mixing/bagging lines are located in covered buildings to limit wind exposure and minimize dust generation.

b) The soil mixing/bagging lines are equipped with water spray bars.

c) Amendment hoppers are located in enclosed "dust huts" with air filters to reduce fugitive dust.

AQ-2. Odor Impact Minimization Plan: To minimize potential impacts from odors generated by the handling of commercially-produced compost and softwood sawdust, Royal Gold will implement the Odor Impact Minimization Plan required by the County Division of Environmental Health as part of the Environmental Agency Notification for green material composting operations.

Findings: The project would have a **Less-than-significant Impact with Mitigation Incorporated** on Air Quality.

3.2.4 Biological Resources

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on state or federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Environmental Setting:

An Updated Biological Report, including field surveys, was completed for the project (see Appendix 5.5; SHN, 2021b). The Report addresses the environmentally sensitive resources that occur on the project parcels. It incorporates and updates a previous Biological Survey Report that was prepared in 2017 (SHN, 2017a). Additionally, a Wetland and Other Waters Delineation Report (see Appendix 5.6; SHN, 2018c) and a Wetland Mitigation and Monitoring Plan Addendum 1 (see Appendix 5.7; SHN, 2020) were completed which document the existing wetlands at the site and the wetlands that have been or are proposed to be impacted by future site development. The Wetland Mitigation and Monitoring Plan Addendum 1 incorporates and updates a previous Wetland Mitigation and Monitoring Plan that was prepared in 2019 (SHN, 2019b). As discussed in the Wetland Mitigation and Monitoring Plan Addendum 1 (see Appendix 5.7; SHN, 2020), Royal Gold is proposing to mitigate wetland impacts onsite at a 2:1 replacement ratio. The results of these reports are discussed below.

The Royal Gold facility is located on sixteen parcels north of Glendale Drive: APNs 516-101-005, -008, -017, -040, -041, -060, -063, -064, -068, -079, -081, -083, and -084; 516-111-003,

-062, and -063. The parcels containing the Royal Gold soil manufacturing facility total approximately 46 acres. The soil operation facility boundary encompasses approximately 34 acres of these parcels. Therefore, approximately 12 acres of the above-listed parcels are not within the facility boundary containing the soil manufacturing activity. The project site is located in the unincorporated community of Glendale, which contains a mixture of commercial, industrial, residential, and agricultural uses.

The project site is situated at an average 110-foot elevation above mean sea level in northern Humboldt County. The region experiences a Mediterranean climate with warm, dry summers and cool, wet winters. The bulk of annual precipitation occurs in the fall, winter, and spring (December averages 8.12 inches). Summers are typically dry (August averages 0.31 inches). The annual average precipitation is 40.53 inches.

Site Description and Environmental Baseline

Prior to Royal Gold's occupancy of the site, several lumber mills operated at the site under multiple different companies since the 1950s. Most recently, Blue Lake Forest Products, Inc. began operation at the site in 1986 and ceased operations in April 2002. Figure 4 – Blue Lake Forest Products Historic Aerial Photo (unknown date) is an aerial photo of the site when it was operated by Blue Lake Forest Products. After Blue Lake Forest Products, Inc. ceased operations, Gess Environmental conducted a greenwaste recycling and composting operation on the eastern portion of the site for several years. Royal Gold began operations at the site in March 2009, which is used as the environmental baseline for the CEQA document being prepared for the project.

When Royal Gold moved to the site in 2009, it contained remnants of the former industrial uses including asphalt and concrete pavement, buildings, compacted gravel surfaces, constructed stormwater management features, fencing, and utility infrastructure. The majority of the improvements on the site in 2009 were in the southern portion of the site. The northern portion of the site contained compacted gravel surfaces and graded and compacted soils that were historically used for log storage (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]). Since no field visits to assess biological resources were conducted at the site until approximately 2014, the discussion below contains assumptions about the resources present at the site in the baseline year of 2009. These assumptions are based on review of aerial photography and the knowledge of site conditions beginning in 2014.

Onsite habitat in 2009 primarily consisted of several intermittent drainages and seasonal wetlands formed atop surfaces compacted by past industrial use of the property. The drainages at the site occurred along the northwestern, eastern, and southeastern portions of the site. The eastern and southeastern drainages were channelized stormwater ditches, lined with red alder (*Alnus rubra*) and arroyo willow (*Salix lasiolepis*). Wetland areas had formed along the eastern boundary adjacent to the intermittent drainage and isolated wetlands had formed in the eastern central and southern central portions of the site. The wetlands at the site are classified by the National Wetland Inventory (NWI) as palustrine emergent, persistent, seasonally flooded (PEM1C). However, the forested wetlands at the site are more accurately classified as palustrine scrub-shrub, broadleaved deciduous, seasonally flooded (PSS1C). Dominant botanical species within the wetland areas included red alder, arroyo willow, pacific willow (*Salix lasiandra* var.

lasiandra), Himalayan blackberry (*Rubus armeniacus*), California blackberry (*Rubus ursinus*), common rush (*Juncus effusus* ssp. *pacificus*), bur clover (*Medicago polymorpha*), velvet grass (*Holcus lanatus*), tall fescue (*Festuca arundinacea*), and creeping buttercup (*Ranunculus repens*). The drainage in the northwestern portion of the site contained a more mature riparian canopy that was lined with seasonal wetlands on its southern boundary.

Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year (2009) shows the streamside management area (SMA) boundaries required by the Humboldt County Code (Section 314-61.1) that are estimated to have applied in 2009 when Royal Gold moved to the site. Due to the existing improvements and disturbed condition of the site from past industrial activity (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]), the SMA boundaries surrounding the drainages and wetlands contained limited habitat value in 2009. Much of the SMA boundaries contained pavement, stormwater improvements, compacted gravel surfaces, graded and compacted soils, and/or non-native, invasive vegetation. Due to several downstream barriers (for example, culverts, drainage inlets, etc.), the drainages at the site were not fish-bearing. However, these drainages provided habitat for other aquatic species and flowed to fish-bearing streams, including Hall Creek and the Mad River. These drainages were likely movement corridors for amphibians and small mammals in 2009, as they are today. Herbaceous vegetation has increased within the SMA boundaries in the eastern and northwestern portions of the site since 2009, which now contain more suitable habitat for small animals and some botanical species. However, these areas are still degraded from past industrial use and disturbance and mostly characterized by non-native botanical species and compacted soils.

Since moving to the site in 2009, Royal Gold has constructed several improvements to accommodate the needs of their business, including, but not limited to, additional paving, two new buildings (arch-truss design consisting of steel tube trusses and polyethylene fabric covers), stormwater features (for example, detention basins, bioswales, etc.), security fencing, utility infrastructure, and the construction of earthen berms with imported fill and aggregate material (see Figure 6 – Site Plan). Improvements to the site have included the conversion of the wetlands in the southern central portion of the site to stormwater detention basins and the filling of some of these wetlands for use as paving, parking, storage, and coco processing (see Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline year [2009] and Figure 12 – Site Plan with Baseline Year [2009] Streamside Management Areas). Several improvements constructed by Royal Gold also encroach into the SMA boundaries that are estimated to have been applicable in 2009. As indicated in Figure 12 – Site Plan with Baseline Year (2009) Streamside Management Areas, the encroaching improvements include a new building, paving, earthen berms, water tanks, parking, stormwater management features, a coco processing area, and storage areas. The stormwater management features at the site are shown in Figure 13 – SWPPP BMP Location Map.

Figure 11: Drainages/Wetlands and SMA Boundary in Baseline Year (2009)

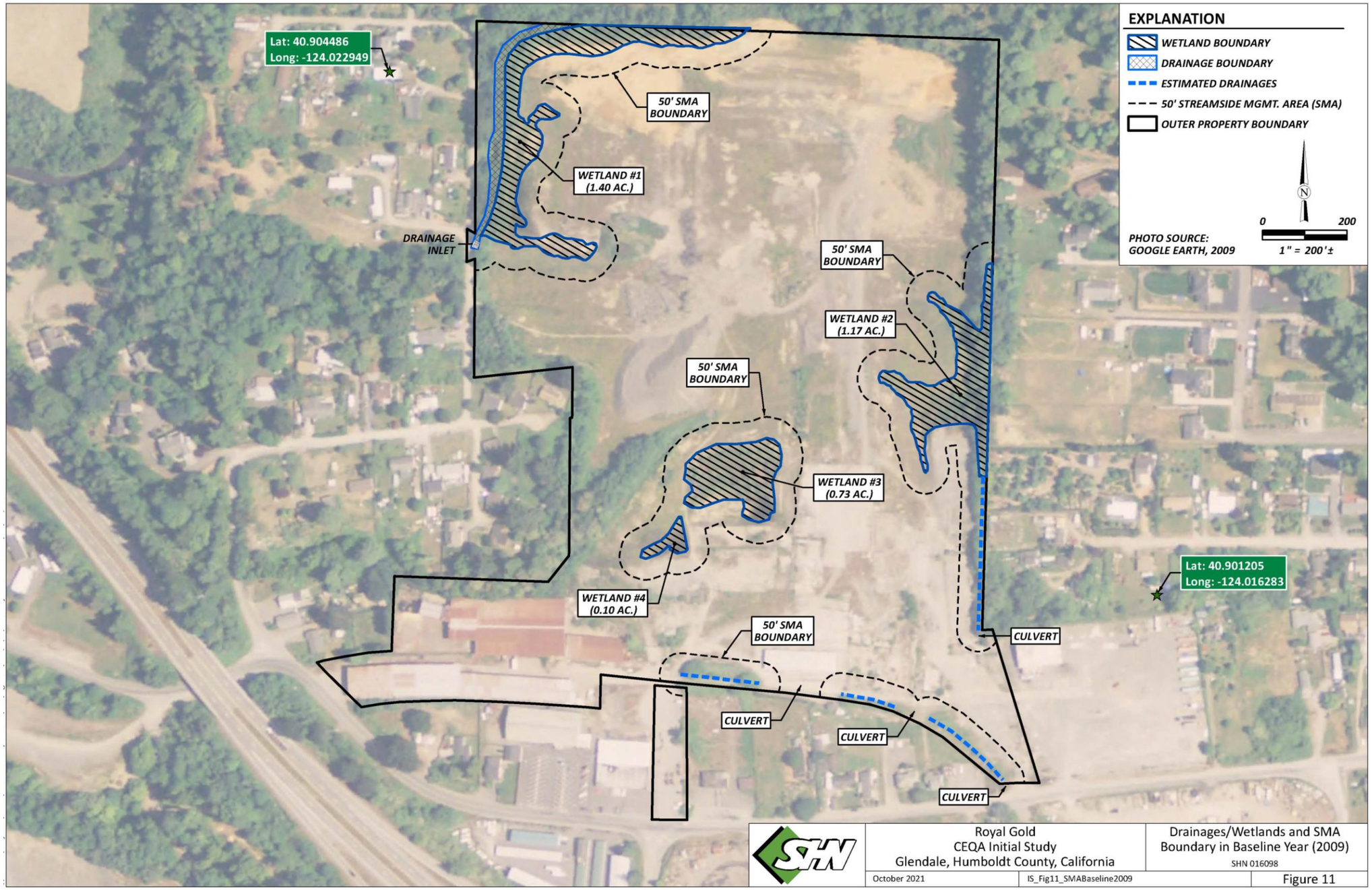


Figure 12: Site Plan with Baseline Year (2009) Streamside Management Areas

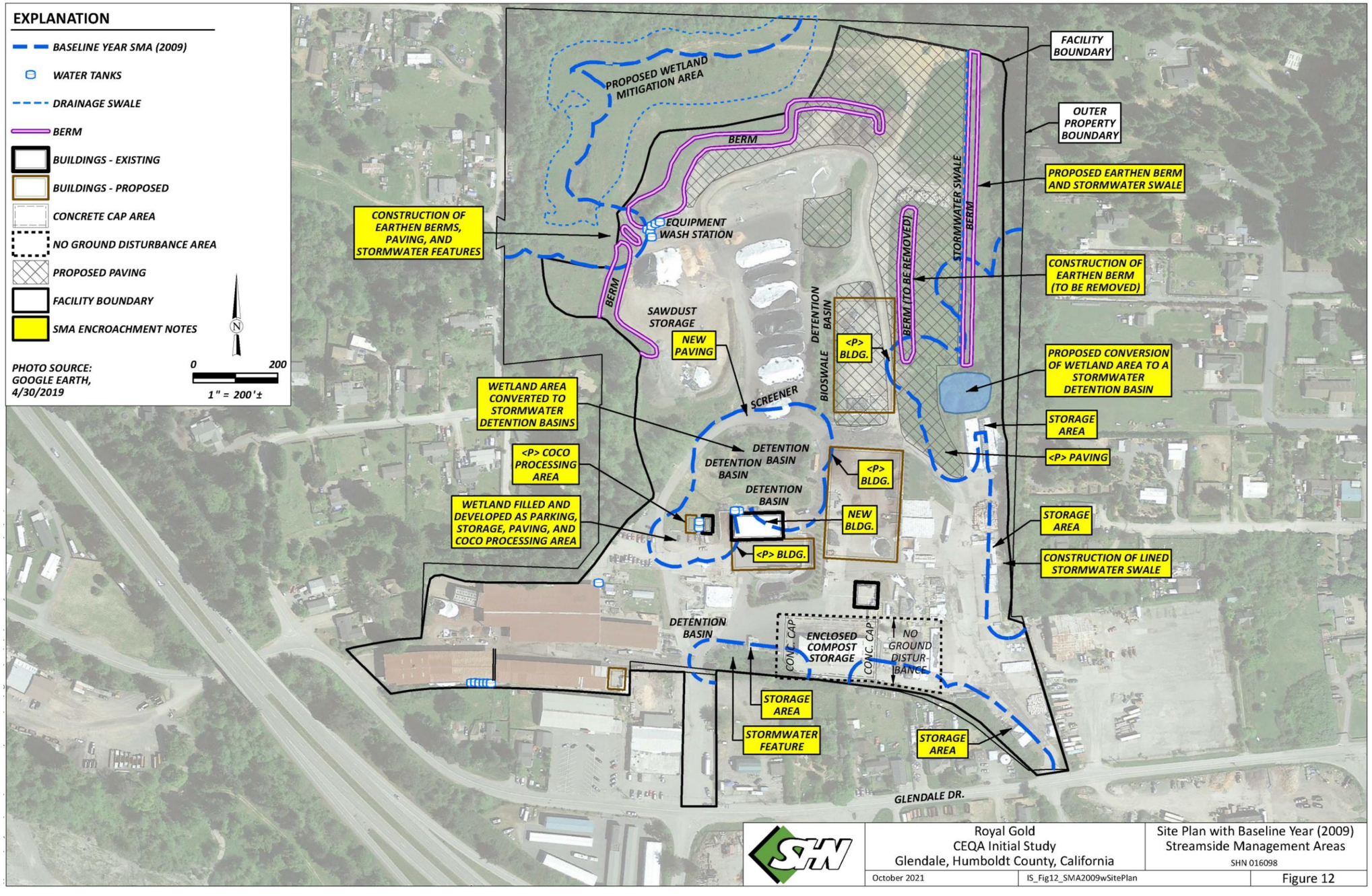


Figure 13: SWPPP BMP Location Map

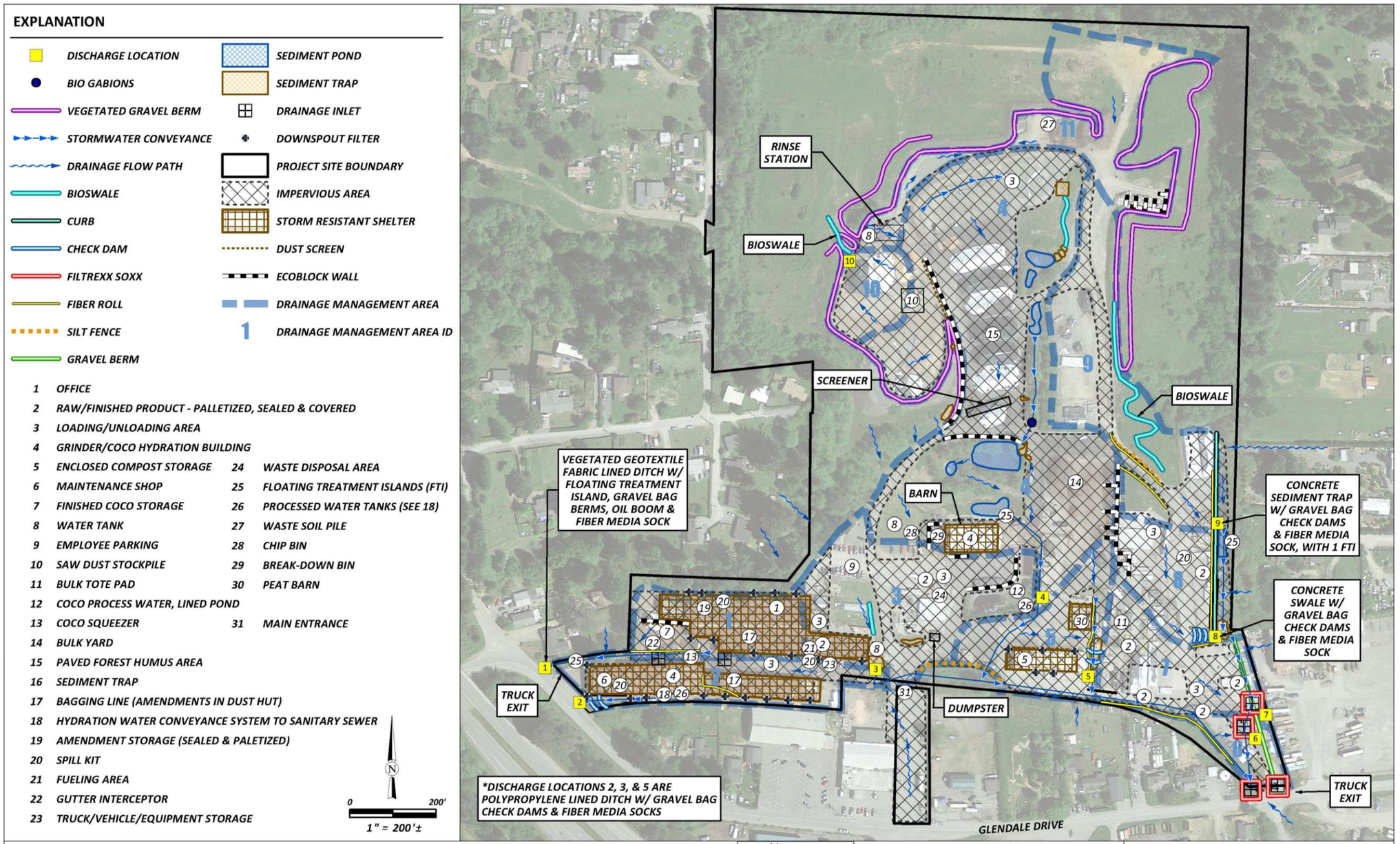


IMAGE SOURCE: GOOGLE EARTH, 2019

NOTES: SUB SURFACE STORMWATER CONVEYANCE SYSTEMS ARE DRAWN AS ESTIMATED LOCATIONS
FEATURES DRAWN SUCH AS CHECK DAMS ARE REPRESENTATIONS AND DO NOT ILLUSTRATE ACTUAL QUANTITY

Royal Gold CEQA Initial Study Glendale, Humboldt County, California		BMP Location Map SHN 016098
October 2021	IS_Fig13_BMPLocationMap	Figure 13

Geologic and Soil Composition

The project site is on the south-facing aspect of the Mad River drainage. The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS; NRCS, 2021) Web Soil Survey classifies the soils at the project site as Timmons and Lepoil soils, 0 to 2 percent slopes; Lepoil-Candymountain complex, 2 to 15 percent slopes; and Lepoil-Espa-Candymountain complex, 15 to 50 percent slopes, all of which are considered well drained. As the site was historically used as a lumber mill and log decks, native soils had been graded, covered with fill, and/or paved prior to the current occupancy of the site by Royal Gold (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]).

Vegetation

Vegetation is limited across the site, with many areas not supporting vegetation due to compacted gravel surfaces and regular vehicle traffic. Less disturbed areas supported non-native grasslands dominated by tall fescue, velvet grass, sweet vernal grass (*Anthoxanthum odoratum*), hairy cats-ear (*Hypochaeris radicata*), and in some places, toad rush (*Juncus bufonius* var. *bufonius*). The edges of the project area support a developing canopy of red alder, arroyo willow, and young conifers such as Sitka spruce (*Picea sitchensis*) and Douglas fir (*Pseudotsuga menziesii*). Areas with developing red alder canopy cover may represent a transition to red alder forest alliance within the wetter portions of the project area. Red alder forest has a rarity ranking of G5S4, meaning it is secure globally, and presumably secure within the state of California. The areas within the project area supporting red alder saplings are not high-quality examples of this vegetation community, but rather represent a transition from maintained drainage ditches to more natural botanical communities. Numerous vegetation communities surround the project site, including upland conifer forests to the north of the project, and riparian woodlands along the Mad River and larger tributaries such as Hall Creek to the southeast of the project.

Wildlife Habitats

Due to the disturbed condition of the site from past industrial uses (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]), there is limited wildlife habitat throughout the majority of the site. As indicated on Figure 11 (Drainages/Wetlands and SMA Boundary in Baseline Year [2009]), onsite wildlife habitat primarily consists of several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site and seasonal wetlands that occur within the northwestern and central portions of the site. As discussed above, the wetlands in the central southern portion of the site were converted to stormwater detention basins or filled for use as paving, parking, storage, and coco processing (see Figure 12 – Site Plan with Baseline Year [2009] Streamside Management Area and Appendix 5.7; SHN, 2020). The intermittent drainages and seasonal wetlands at the site provide potential habitat for a variety of wildlife. In addition, isolated pools of seasonal water in the undeveloped grassland areas in the northern portion of the site provide temporary amphibian breeding habitat. Some of the stormwater management features at the site also may provide temporary habitat for wildlife, including aquatic species. The riparian corridor and wetland complex in the northwest portion of the site provides the highest quality habitat for wildlife breeding, foraging, and movement.

Common wildlife species expected within the project site are those typically associated with urban areas, grasslands, riparian areas, and freshwater marshes of northwestern California.

Animal species observed during fieldwork are presented in Appendix 5.5 (SHN, 2021b). Other wildlife species are likely to inhabit the surrounding area and it is expected that there are many other bird, mammal, and amphibian species that might use the study area on a temporal scale. Review of the California Natural Diversity Database mapping identifies nearby Lindsay and Hall Creeks as habitat for coastal cutthroat trout. Hall Creek is also shown as providing habitat for northern red legged frog. Foothill yellow legged frog and Eulachon habitat is found in the nearby stretches of the Lower Mad River. Additionally, the project site lies at the eastern edge of an occurrence report for Bank Swallow with a 2-mile accuracy. However, this species requires earthen vertical banks for nesting, often found along large rivers, and this habitat feature is not present on the project site.

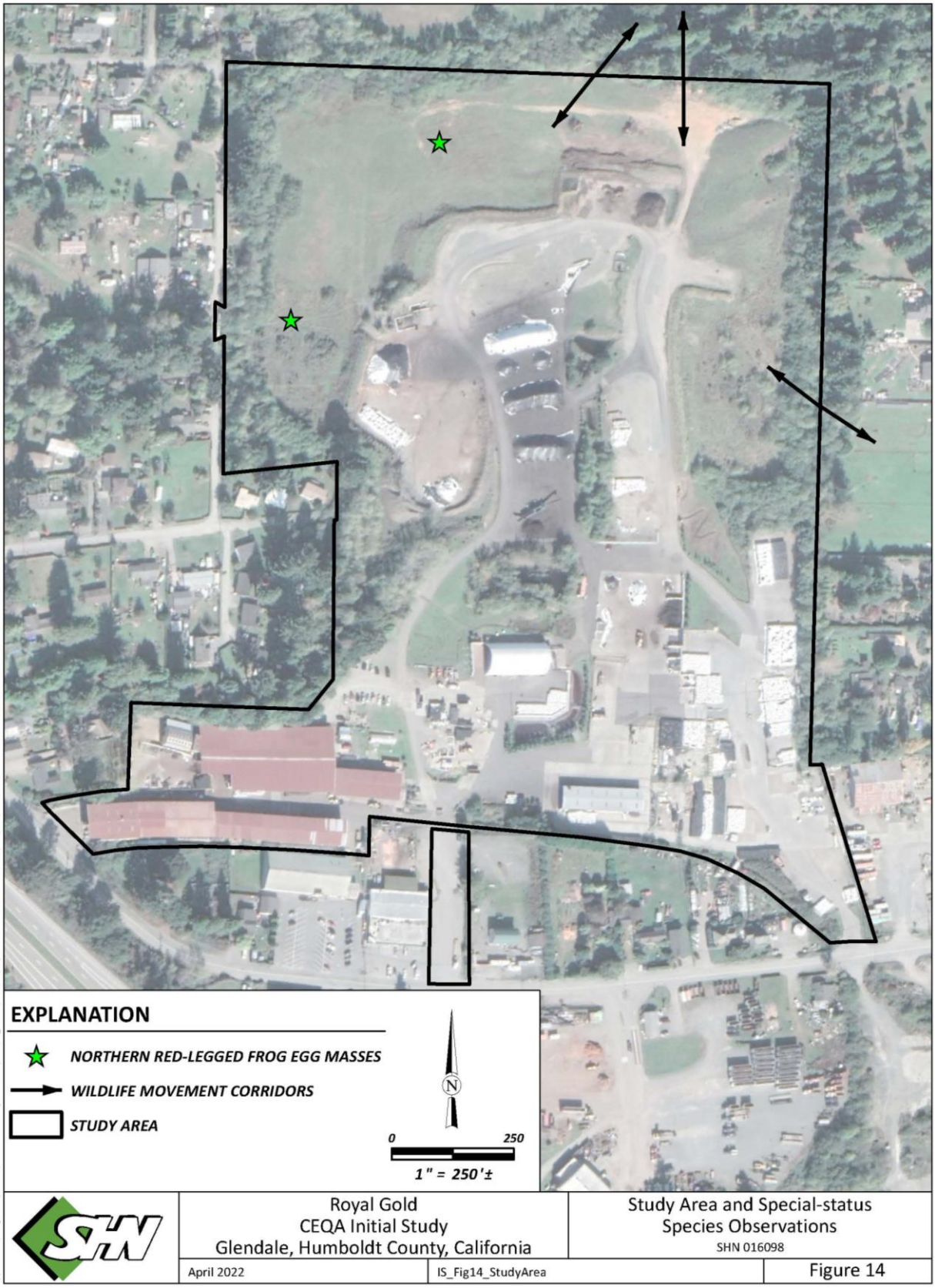
Wildlife movement includes migration (usually one-way per season), inter-population movement (long-term genetic flow), and small travel pathways (daily movement corridors within an animal's territory). Although small travel pathways usually facilitate movement for daily home range activities, such as foraging or escape from predators, they also provide connection between outlying populations and the main corridor, permitting an increase in gene flow among populations (Whitaker, 1998). It is expected that vegetated areas along the perimeter of the project site are used as small travel pathways for a number of species between upland forested habitat and riparian habitat along Hall Creek and the Mad River.

Offsite Conditions

Surrounding land uses and habitat conditions are as follows (see Figure 14 – Study Area and Special-status Species Observations):

- To the North: Mixed conifer and hardwood forest, grassland, and rural residential development.
- To the West: Rural residential development.
- To the East: Rural residential development, industrial/commercial development, and intermittent drainages.
- To the South: Commercial, residential, and industrial development, Glendale Drive, Highway 299, and the Hall Creek riparian corridor.

Figure 14: Study Area and Special-status Species Observations



Regulatory Setting:

Regulatory authority over biological resources is shared by federal, State, and local authorities under a variety of legislative acts. The following section summarizes the federal, State, and local regulations for special-status species, jurisdictional waters of the U.S. and State of California, and other sensitive biological resources. This section provides a listing and overview of these federal, State, and local laws.

Federal Laws – Clean Water Act Sections 404 and 401

Under Section 404 (33 U.S. Code [USC] 1341) of the Clean Water Act (CWA), as amended, the United States Army Corps of Engineers (USACE) retains primary responsibility for permits to discharge dredged or fill material into waters of the U.S. All discharges of dredged or fill material into jurisdictional waters of the U.S. that result in permanent or temporary losses of waters of the U.S. are regulated by the USACE. A permit from the USACE must be obtained before placing fill or grading in wetlands or other waters of the U.S., unless the activity is exempt from CWA Section 404 regulation (for example, certain farming and forestry activities).

The USACE defines wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Environmental Laboratory, 1987). In other words, the USACE defines wetlands by the presence of all three wetland indicators: hydrophytic vegetation, hydric soils, and wetland hydrology.

Waters of the U.S. are defined in 33 Code of Federal Regulations (CFR) Part 328. They include traditional navigable waters; relatively permanent, non-navigable tributaries of traditional navigable waters; and certain wetlands. Following recent court cases, the United States Environmental Protection Agency (EPA) and USACE published a memorandum entitled "Clean Water Act Jurisdiction" (EPA/USACE, 2008) to guide the determination of jurisdiction over waters of the U.S., especially for wetlands. The applicability of Section 404 permitting over discharges to wetlands is, therefore, a two-step process: 1) determining the areas that are wetlands, and 2) where a wetland is present, assessing the wetland's connection to traditional navigable waters and non-navigable tributaries to determine whether the wetland is jurisdictional under the CWA. A wetland is considered jurisdictional if it meets certain specified criteria.

The USACE is required to consult with the United States Fish & Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) under Section 7 of the Federal Endangered Species Act (FESA) if the action subject to CWA permitting could result in "Take" of federally-listed species or an adverse effect to designated critical habitat. The project is within the jurisdiction of the San Francisco District of the USACE.

Section 401 of the CWA (33 USC 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the U.S. to obtain a certification from the state in which the discharge originates or would originate, or if appropriate, from the interstate water pollution control agency having jurisdiction over the affected waters at the point where the discharge originates or would originate, that the discharge

will comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility. The responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCBs). The project site is within the jurisdiction of the North Coast RWQCB.

Federal Laws – Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 USC Sections 661-667e, as amended, 1958, 1978, 1994, and 1995) requires that whenever waters, the channel of a stream, or other body of water are proposed or authorized to be modified by a public or private agency under a federal license or permit, the federal agency must first consult with the USFWS and/or NMFS and with the head of the agency exercising administration over the wildlife resources of the state where construction will occur (in this case, the California Department of Fish &Wildlife [CDFW]). These guidelines aim at conservation of birds, fish, mammals, and all other classes of wild animals, and all types of aquatic and land vegetation upon which wildlife is dependent.

If direct permanent impacts occur to waters of the U.S. from a proposed project, then a permit from USACE under CWA Section 404 is required for the construction of the proposed project. USACE is required to consult with USFWS and/or NMFS as appropriate regarding potential impacts to federally-listed species under FESA. Such action may prompt consultation with CDFW, which would review the project pursuant to California Endangered Species Act (CESA) and issue a consistency letter with USFWS and/or NMFS, if required.

Federal Laws – Federal Endangered Species Act

The United States Congress passed the FESA in 1973 to protect species that are endangered or threatened with extinction (USFWS, 1973). The FESA is intended to operate in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend and within which they live. The USFWS and the NMFS are the designated federal agencies responsible for administering the FESA.

The FESA prohibits the "Take" of endangered or threatened wildlife species. A "Take" is defined as harassing, harming (including significantly modifying or degrading habitat), pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species, or any attempt to engage in such conduct (16 USC 1531, 50 CFR 17.3). An activity can be defined as a "Take" even if it is unintentional or accidental. Taking can result in civil or criminal penalties. Activities that could result in "Take" of a federally-listed species require an incidental "Take" authorization resulting from FESA Section 7 consultation or FESA Section 10 consultation. Plants are legally protected under the FESA only if "Take" occurs on federal land or from federal actions, such as, issuing a wetland fill permit.

A federal endangered species is one that is considered in danger of becoming extinct throughout all, or a significant portion, of its range. A federal threatened species is one that is likely to become endangered in the foreseeable future. The USFWS also maintains a list of species proposed for listing as threatened or endangered. Proposed species are those for which a proposed rule to list as endangered or threatened has been published in the Federal Register. In addition to endangered, threatened, and proposed species, the USFWS maintains a list of

candidate species. Candidate species are those for which the USFWS has on file sufficient information to support issuance of a proposed listing rule.

Pursuant to the requirements of the FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally-listed endangered or threatened species may be present in the project area, and determine whether the proposed project will have a potentially significant impact on such a species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the FESA or result in the destruction or adverse modification of critical habitat designated or proposed to be designated for such species (16 USC 1536[3], [4]). Project-related impacts to species on the FESA endangered or threatened list would be considered significant, and would require mitigation.

Federal Laws – Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21; USFWS, 1918). The MBTA also prohibits disturbance and harassment of nesting migratory birds at any time during their breeding season. The USFWS is responsible for enforcing the MBTA (16 USC 703). The migratory bird nesting season is generally considered to be between March 15 and August 31 within the project area.

State Laws – Porter-Cologne Water Quality Control Act

The state and RWQCB also maintain independent regulatory authority over the placement of waste, including fill, into waters of the state under the Porter-Cologne Water Quality Control Act (SWRCB, 1969). Waters of the state are defined by the Porter-Cologne Water Quality Control Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The SWRCB protects all waters in its regulatory scope but has special responsibility for isolated wetlands and headwaters. These water bodies might not be regulated by other programs, such as Section 404 of the CWA. Waters of the state are regulated by the RWQCBs under the State Water Quality Certification Program, which regulates discharges of dredged and fill material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act. Projects that require an USACE permit, or fall under other federal jurisdiction, and have the potential to impact waters of the state are required to comply with the terms of the Water Quality Certification Program. If a proposed project does not require a federal license or permit but does involve activities that may result in a discharge of harmful substances to waters of the state, the RWQCBs have the option to regulate such activities under their state authority in the form of Waste Discharge Requirements (WDRs) or certification of WDRs.

State Laws – California Endangered Species Act

The State of California enacted the CESA in 1984. The CESA is similar to the FESA but pertains to state-listed endangered and threatened species. Under the CESA, the CDFW has the responsibility for maintaining a list of threatened and endangered species designated under state law (California Fish and Game Code [CFGC] 2070; CDFW, 1998). Section 2080 of the CFGC prohibits "Take" of any species that the commission determines to be an endangered or

threatened species. "Take" is defined in Section 86 of the CFGC as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

The state and federal lists of threatened and endangered species are generally similar; however, a species present on one list may be absent from the other. CESA regulations are also somewhat different from the FESA in that the California regulations include threatened, endangered, and candidate plants on non-federal lands within the definition of "Take." CESA allows for "Take" incidental to otherwise lawful development projects.

Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. Project-related impacts to species on the CESA endangered or threatened list (or, in addition, designated by the CDFW as a Species of Special Concern [SSC], which is a level below threatened or endangered status) would be considered significant and would require mitigation.

State Laws – Native Plant Protection Act

The Native Plant Protection Act (NPPA; Sec. 1900-1913 of the CFGC) was enacted in 1977 and allows the Fish and Game Commission to designate plants as rare or endangered. The NPPA precedes the CESA. Statewide, there are 64 species, subspecies, and varieties of plants that are protected as rare under the NPPA. The NPPA prohibits take of endangered or rare native plants, but includes some exceptions for agricultural and nursery operations, emergencies, and after properly notifying CDFW for vegetation removal from canals, roads, and other sites, changes in land use, and in certain other situations. Plants listed as rare or endangered under the NPPA should be considered during project review as if they were listed under the CESA.

State Laws – California Environmental Quality Act

California Environmental Quality Act (CEQA) Guidelines Sections 15125(c) and 15380(d) provide that a species not listed on the federal or State list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. Thus, CEQA provides the ability to protect a species from potential project impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

The California Native Plant Society (CNPS) maintains an inventory of botanical species native to California, with populations that are significantly reduced from historical levels, occur in limited distribution, or otherwise are rare or threatened with extinction. This information is published in the Inventory of Rare and Endangered Plants of California (CNPS, 2021). Taxa with a California Rare Plant Rank (CRPR) of 1A, 1B, 2A, 2B, and 3 in the CNPS inventory consist of plants that are eligible for state listing, and meet the definition of Rare or Endangered under CEQA Guidelines Sections 15125(c) and 15380(d). CRPR 4 populations may qualify for consideration under CEQA if they are peripheral or disjunct populations, represent the type locality of the species, or exhibit unusual morphology and/or occur on unusual substrates.

Additionally, CDFW maintains lists of special-status animals and plants. These lists include a species conservation ranking status from multiple sources, including FESA, CESA, federal departments with unique jurisdictions, CNPS, and other non-governmental organizations. Based on these sources, CDFW assigns a heritage rank to each species according to their degree of imperilment (as measured by rarity, trends, and threats). These ranks follow NatureServe's Heritage Methodology, in which all species are listed with a G (global) and S (state) rank. Species with state ranks of S1-S3 are also considered highly imperiled.

CEQA Guidelines checklist IV(b) calls for the consideration of riparian habitats and sensitive natural communities. Sensitive vegetation communities are natural communities and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. However, these communities may or may not necessarily contain special-status species. Sensitive natural communities are usually identified in local or regional plans, policies, or regulations, or by the CDFW (that is, the CNDDB and the Vegetation Classification and Mapping Program [VegCAMP]) or the USFWS. Impacts to sensitive natural communities and habitats must be considered and evaluated under CEQA (California Code of Regulations [CCR]: Title 14, Division 6, Chapter 3).

Although sensitive natural communities do not (at present) have legal protection, CEQA calls for an assessment of whether any such resources would be affected and requires a finding of significance if there will be substantial losses. High-quality occurrences of natural communities with heritage ranks of 3 or lower are considered by CDFW to be significant resources and fall under the CEQA guidelines for addressing impacts. Local planning documents (such as general plans) often identify these resources as well. Avoidance, minimizations, or mitigation measures should be implemented if project-affected stands of rare vegetation types or natural communities are considered high-quality occurrences of the given community.

As a trustee agency under CEQA, CDFW reviews potential project impacts to biological resources, including wetlands. In accordance with the CEQA thresholds of significance for biological resources, areas that meet the state criteria for wetlands and could be impacted by a project must be analyzed. Pursuant to CFGC Section 2785, CDFW defines wet areas as "lands which may be covered periodically or permanently with shallow water and which include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, fens, and vernal pools."

State Laws – California Fish and Game Code Section 1600

Streams, lakes, and riparian vegetation as habitat for fish and other wildlife species, are subject to jurisdiction by the CDFW under Sections 1600-1616 of the CFGC (CDFW, 2021a). Any activity that will do one or more of the following generally require a Lake and Streambed Alteration (LSA) Agreement:

1) Substantially obstruct or divert the natural flow of a river, stream, or lake

2) Substantially change or use any material from the bed, channel, or bank of a river, stream, or lake

3) Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

The term "stream," which includes creeks and rivers, is defined in the CCR as, "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life." This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation (14 CCR 1.72).

In addition, the term "stream" can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. Riparian is defined as "on, or pertaining to, the banks of a stream"; therefore, riparian vegetation is defined as vegetation that occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself. Removal of riparian vegetation also requires an LSA agreement from CDFW.

State Laws – California Fish and Game Code Sections 3503 and 3513

According to Section 3503 of the CFGC, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (except English sparrows [*Passer domesticus*] and European starlings [*Sturnus vulgaris*]). Section 3503.5 specifically protects birds in the orders Falconiformes and Strigiformes (birds-of-prey). Section 3513 essentially overlaps with the MBTA, prohibiting the "Take" or possession of any migratory non-game bird. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "Take" by the CDFW.

State Laws – Fully Protected Species and Species of Special Concern

The classification of "fully protected" was the CDFW's initial effort to identify and provide additional protection to those animals that were rare or faced with possible extinction. Lists were created for fishes, amphibians, reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. The CFGC sections (fish at Section 5515, amphibians and reptiles at Section 5050, birds at Section 3511, and mammals at Section 4700) dealing with "fully protected" species state that these species "…may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species," (CDFW, 1998) although "Take" may be authorized for necessary scientific research. This language makes the "fully protected" designation the strongest and most restrictive regarding the "Take" of these species. In 2003, the code sections dealing with fully protected species were amended to allow the CDFW to authorize "Take" resulting from recovery activities for state-listed species.

SSCs are broadly defined as animals not listed under the CESA, but that are nonetheless of concern to the CDFW because they are declining at a rate that could result in listing or historically occurred in low numbers with known threats to their persistence currently existing. This designation is intended to result in special consideration for these animals by the CDFW, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under CESA and cumbersome recovery efforts that might ultimately be required. This designation also is intended to stimulate collection of additional information on the biology, distribution, and status of poorly known at-risk species, and focus

research and management attention on them. Although the SSC designation provides no special legal status, they are given special consideration under CEQA during project review.

State Laws – Natural Community Conservation Planning Act

The Natural Community Conservation Planning (NCCP) Act of 1991 is an effort by the State of California and numerous private and public partners that is broader in its orientation and objectives than the CESA and FESA (refer to discussions above). The primary objective of the NCCP Act is to conserve natural communities at the ecosystem scale while accommodating compatible land uses (CDFW, 1991). The NCCP Act seeks to anticipate and prevent the controversies and gridlock caused by species listings by focusing on the long-term stability of wildlife and botanical communities and including key interests in the process. No regionally-occurring natural community or associated plan is listed by the state for the project area.

Local Laws – Humboldt County General Plan

An update of the Humboldt County General Plan was adopted October 23, 2017. Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan includes policies regarding the protection of critical habitats, sensitive habitats, SMAs, wetlands, oak woodlands, and invasive species. Critical habitats are habitats necessary for the protection of threatened or endangered species listed under the FESA. In addition to species and communities identified by the USFWS and CDFW, migratory deer winter ranges, Roosevelt elk ranges, avian rookery/nesting sites, streams and streamside areas, and wetland areas are defined as sensitive habitats (Humboldt County, 2017a).

Standard BR-S5 in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan provides a definition of SMAs, which include a natural resource area along both sides of streams containing the channel and adjacent land. SMAs do not include watercourses consisting entirely of a man-made drainage ditch, or other man-made drainage device, construction, or system (Humboldt County, 2017a).

SMAs are areas specifically mapped as SMA and Wetland (WR) Combining Zones, subject to verification and adjustment pursuant to site-specific biological reporting and review procedures. For areas along streams not specifically mapped as SMA and WR Combining Zones, the outer boundaries of the SMA shall be defined as:

1. 100 feet, measured as the horizontal distance from the top of bank or edge of riparian drip-line whichever is greater on either side of perennial streams.
2. 50 feet, measured as the horizontal distance from the top of bank or edge of riparian drip-line whichever is greater on either side of intermittent streams.
3. The width of Streamside Management Areas shall not exceed 200 feet measured as a horizontal distance from the top of bank.

SMAs may be reduced or eliminated where the County determines, based on specific factual findings, that the mapping of the SMA is not accurate, there are no in-channel wetland characteristics or off-channel riparian vegetation, the reduction will not significantly affect the biological resources of the SMA on the property. When the prescribed buffer would prohibit

development of the site for the principal use for which it is designated, measures shall be applied that result in the least environmentally damaging feasible project (Humboldt County, 2017a).

Standard BR-S11 in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan provides a definition of wetlands, which states the following:

> "*The County shall follow the US Army Corps of Engineers Wetland Delineation manual in the identification and classification of wetlands which considers wetlands as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas*." (Humboldt County, 2017a)

Standard BR-S10 in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan provides the development standards for wetlands. Setbacks for wetlands begin at the edge of the delineated wetland and the widths of the SMA for wetlands is 50 feet for seasonal wetlands and 150 for perennial wetlands. Buffers may be reduced based on site specific information and consultation with the California Department of Fish and Wildlife. No buffer shall be required for man-made wetlands except wetlands created for mitigation purposes.

Local Laws – Humboldt County Streamside Management Areas & Wetlands Ordinance

Humboldt County Code Section 314-61.1 (Streamside Management Areas and Wetlands Ordinance [SMAWO]) implements the goals, policies, and standards for streamside management areas, wetlands, and other wet areas contained in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan. All development within or affecting SMAs, wetlands, or other wet areas not exempted under County Code Section 314-61.1.4, requires a Special Permit from the County. Section 61.1.4.1 exempts routine maintenance activities from the requirement to obtain a Special Permit, which are defined as "*activities to support, keep and continue in an existing state or condition without decline*." Routine maintenance activities include the replacement of culverts and related structures when conducted pursuant to a Department of Fish and Wildlife LSA Agreement. The streamside management area may be reduced or eliminated for projects otherwise subject to ministerial review or where a prescribed buffer would prevent development of the site for the principal use for which it is designated. Where habitat has been converted to other uses, mitigation provisions of the ordinance require that projects be conditioned to include development of new riparian or wetland habitat of an area equal to the area in which the development is to occur.

Biological Report – Methodology and Results:

Biological Report - Methodology

An Updated Biological Report, including field surveys, was completed for the project (Appendix 5.5; SHN, 2021b). It included a review of current existing data and information related to special-status species of plants, animals, and sensitive natural communities that may be present at the site containing the Royal Gold facility. It incorporates and updates a previous Biological

Survey Report that was prepared in 2017 (SHN, 2017a). Wildlife habitat survey and observations were conducted in 2021 by an SHN senior biologist. Botanical surveys and observations were conducted by an SHN senior botanist in 2017 and 2021.

The findings of this report are the result of several sources, including a review of existing literature regarding sensitive biological resources that have the potential to occur within the study area. The study area was defined as the area of potential project activities (see Figure 14 – Study Area and Special-status Species Observations). Biological scoping included a review of the following sources:

- California Natural Diversity Database (CNDDB) query for Arcata North and surrounding United States Geological Survey (USGS) 7.5-minute topographic quadrangles (Crannell, Panther Creek, Blue Lake, Korbel, Arcata South, Eureka, Tyee City, and Trinidad) (CDFW, 2021b).
- Biogeographical Information and Observation System's Rarefind[3] database (BIOS; CDFW, 2021c).
- Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS, 2021) query for a list of all botanical species reported for project area, and surrounding USGS 7.5-minute topographic quadrangles.
- Special Animals of California List (CDFW, 2021d).
- USFWS Information for Planning and Conservation (IPaC) was queried for threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of, and/or may be affected by, the proposed project (USFWS, 2021a).
- USFWS Threatened and Endangered Species Active Critical Habitat Report Geographic Information System (GIS) database (USFWS, 2021b).

From the sources listed above, lists of target special-status botanical and animal species potentially occurring within the study area were compiled. Appendix 5.5 (SHN, 2021b) lists botanical and animal species reported by the CNDDB and USFWS, species listed in the CNPS inventory of rare plants, and the USFWS IPaC query results.

Sites visits were conducted on January 17, 24, and 25, and July 27, 2017, for an assessment of the habitat, botanical and animal species present, vegetation communities found within the project area, and the potential for the occurrence of any listed botanical or animal species, or associated habitat. The 2017 surveys included a botanical survey within the late season blooming period. Additionally, a total of twelve staff hours of field observations were made

[3] Rarefind is a "positive detection" database. The absence of data does not imply absence of special-status species.

within the study area on January 20, April 14, and April 27, 2021. This involved surveys for botanical and animal species, including a botanical survey during the early season blooming period (see Appendix 5.5; SHN, 2021b).

The CNDDB, CNPS, and IPaC databases were queried for updates to the previously prepared 2017 scoping lists prior to conducting the 2021 site visits (see Appendix 5.5; SHN, 2021b). Lists of all botanical and animal species observed while conducting the 2021 field visits are presented in the Updated Biological Report (see Appendix 5.5; SHN, 2021b). Nomenclature for special-status animals conforms to the CDFW Special Animals List (CDFW, 2021d). Habitat assessments were also conducted for special-status botanical and animal species during the 2021 site visits. Site photographs from the site visits are included in the Updated Biological Report (see Appendix 5.5; SHN, 2021b).

Biological Report – Results – Special-status Botanical Species

A total of 72 special-status botanical species have been reported from the region consisting of the project site's quadrangle and surrounding quadrangles. Of the special-status botanical species reported in the region, 66 species have low or no potential to occur and 6 species have a moderate or high potential to occur within the project area – Rattan's milk vetch (*Astragalus rattanii* var. *rattanii*), harlequin lotus (*Hosackia gracilis*), Howell's montia (*Montia howellii*), nodding semaphore grass (*Pleuropogon refractus*), trailing black currant (*Ribes laxiflorum*), and maple leaved checkerbloom (*Sidalcea malachroides*). A protocol-level early season botanical survey was conducted on April 27, 2021 to provide a current botanical list for the expanded project area. Results from this survey were combined with the late-season survey results from the 2017 Biological Report for a comprehensive list of botanical species observed within the study area (see Appendix 5.5; SHN, 2021b).

No special-status botanical species were observed during the 2017 or 2021 botanical surveys. Although habitat for the above listed six special-status botanical species does exist within the project area, these species were not observed at the project site.

Biological Report – Results – Special-status Animal Species

A total of 59 special-status animal species have been reported from the region consisting of the project site's quadrangle and surrounding quadrangles. Of the special-status animal species reported in the region, 50 species have low or no potential to occur and 9 species have a moderate or high potential to occur within the project area – northern red-legged frog (*Rana aurora*), Cooper's hawk (*Accipiter cooperii*), great egret (*Ardea alba*), great blue heron (*Ardea herodias*), American peregrine falcon (*Falco peregrinus anatum*), yellow-breasted chat (*Icteria virens*), black-capped chickadee (*Poecile atricapillus*), yellow warbler (*Setophaga petechia),* and hoary bat (*Lasiurus cinereus*).

A special-status animal survey and habitat assessment occurred January 20 and April 14, 2021. One special-status animal species was observed within the study area during the 2021 animal surveys – the northern red-legged frog. Northern red-legged frog egg masses were observed in pooling water in the northern portion of the study area, which is proposed for wetland creation as mitigation for existing and proposed wetland impacts at the project site (see Figure 14 – Study Area and Special-status Species Observations). Although not observed during the 2021 animal

surveys, there are several bird species that have potential nesting habitat at the project site (see Appendix 5.5; SHN, 2021b).

Biological Report – Results – Special-status Habitats and Natural Communities – Designated Critical Habitat

USFWS's Critical Habitat database was searched for habitat designated as critical for species listed under the FESA and CDFW's CNDDB BIOS was queried for Designated Critical Habitat for species listed under FESA and CESA. The CDFW database reported that the nearest critical habitat is 0.16 miles away to the south (Hall Creek) and 0.25 miles to the west (Grassy Creek), specifically for the steelhead (*Oncorhynchus mykiss irideus*).

Biological Report – Results – Special-status Habitats and Natural Communities – Vegetation Communities

Sensitive natural communities are habitats that are generally defined by vegetation type and geographical location and are increasingly restricted in abundance and distribution. Recognition of natural communities is an ecosystem-based approach to maintaining biodiversity in California. High-quality occurrences of natural communities with heritage ranks of 3 or lower are considered by CDFW to be significant resources and fall under the CEQA guidelines for addressing impacts. The edges of the study area support a developing red alder forest alliance within the drainage ditches and wetter portions of the study area. Red alder forest has a rarity ranking of G5S4 meaning, secure globally, and presumably secure within the state of California. The portions of the study area supporting red alder saplings are not high-quality examples of this vegetation community, but rather represent a transition from maintained drainage ditches to more natural botanical communities. Several vegetation communities surround the project site, including upland mixed conifer forests to the north of the project site and riparian woodlands along the Mad River and its tributaries (for example, Hall Creek) to the southeast of the site.

Biological Report – Results – Special-status Habitats and Natural Communities – Wetland and Riparian Habitats

As indicated on Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year (2009), onsite wetland and riparian habitats consist of seasonal wetlands that occur within the northwestern and central portions of the project site and several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site. As discussed above, the wetlands in the central southern portion of the site were converted by Royal Gold to stormwater detention basins or filled for use as paving, parking, storage, and coco processing (see Figure 12 – Site Plan with Baseline Year [2009] Streamside Management Areas and Appendix 5.7; SHN, 2020). The seasonal wetlands and intermittent drainages at the site provide potential habitat for a variety of wildlife including amphibians and nesting birds. In addition, isolated pools of seasonal water in the undeveloped grassland areas in the northern portion of the site provide temporary amphibian breeding habitat. Some of the stormwater management features at the site also may provide temporary habitat for wildlife, including aquatic species. The stormwater management features at the site are illustrated in Figure 13 – SWPPP BMP Location Map. The riparian corridor and wetland complex in the northwest portion of the site provides the highest quality habitat for wildlife breeding, foraging, and movement.

Biological Report – Results – Special-status Habitats and Natural Communities – Nesting Bird Habitat

All locations with a shrub or tree canopy layer within the project site may provide suitable nesting habitat for a diverse assemblage of migratory birds. The riparian and forested areas along the northern boundary of the site provide adequate nesting opportunity, although other riparian and forested habitats nearby, that are not surrounded by development and disturbance, are of higher quality. Most of the project site is open and exposed and does not provide suitable nesting habitat for most bird species.

Biological Report – Results – Special-status Habitats and Natural Communities – Wildlife Movement Corridors

Watercourses and their associated riparian zones are the primary wildlife movement corridors in the project area due to their complex structure, providing cover and hiding places from predators, and connectivity to other adjacent habitats. Additionally, wildlife may use existing roads and trails that provide corridors between patches of vegetation. The riparian, wetland, and forested areas along the perimeters of the site provide adequate wildlife movement corridors between higher quality habitat areas surrounding the site. During the 2021 animal surveys, it was observed that there is a well-established trail on the northern and eastern boundaries of the site with signs of Roosevelt elk (*Cervus canadensis roosevelti*; scat), racoon (*Procyon lotor*; prints), and gray fox (*Urocyon cinereoargenteus*; prints). The riparian corridor and wetland complex in the northwest portion also functions as an important wildlife movement corridor.

Wetland and Other Waters Delineation Report – Methodology and Results:

Wetland and Other Waters Delineation Report – Methodology

Wetland delineation methods described in *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and *The Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE, 2010) were used to identify potential wetlands and other waters. The routine method for wetland delineation described in the USACE 1987 manual was used to identify potential wetlands within the study area. The USACE method relies on a three-parameter approach, in which criteria for hydrophytic vegetation, hydric soils, and wetland hydrology must each be met (present at the point of field investigation) to conclude that an area qualifies as a wetland. Other USACE-jurisdictional waters represented by Ordinary High Water Mark (OHWM) were delineated, which in non-perennial streams corresponds with the boundaries of the active channel, which are typically expressed by some combination of three primary indicators: a topographic break in slope, change in sediment characteristics, and change in vegetation characteristics (USACE, 2014). Field investigations were conducted on January 17, 24, and 25, 2017 and February 9, 2018. Twenty-four test pits (TPs) were excavated to characterize the area and record information for vegetation, soils, and hydrology (seventeen in 2017 and seven in 2018).

Wetland and Other Waters Delineation Report – Results

Following the USACE three-parameter guidelines, TP5W, TP6W, TP13W, TP15W, TP16W, and TP22W meet the three wetland parameters of hydrophytic vegetation, hydric soils, and wetland hydrology indicators necessary to place them within wetland boundaries (see Figure 15

– Delineated Wetlands; Table 6). Within each of these pits, soils, hydrology, and vegetation were problematic, reflecting the historic and continuing disturbance of this industrial site. Fill soils were present within each pit, and hydrology was manipulated due to past excavation and large machinery work. Vegetation ranged from highly disturbed to not disturbed since closure of the mill.

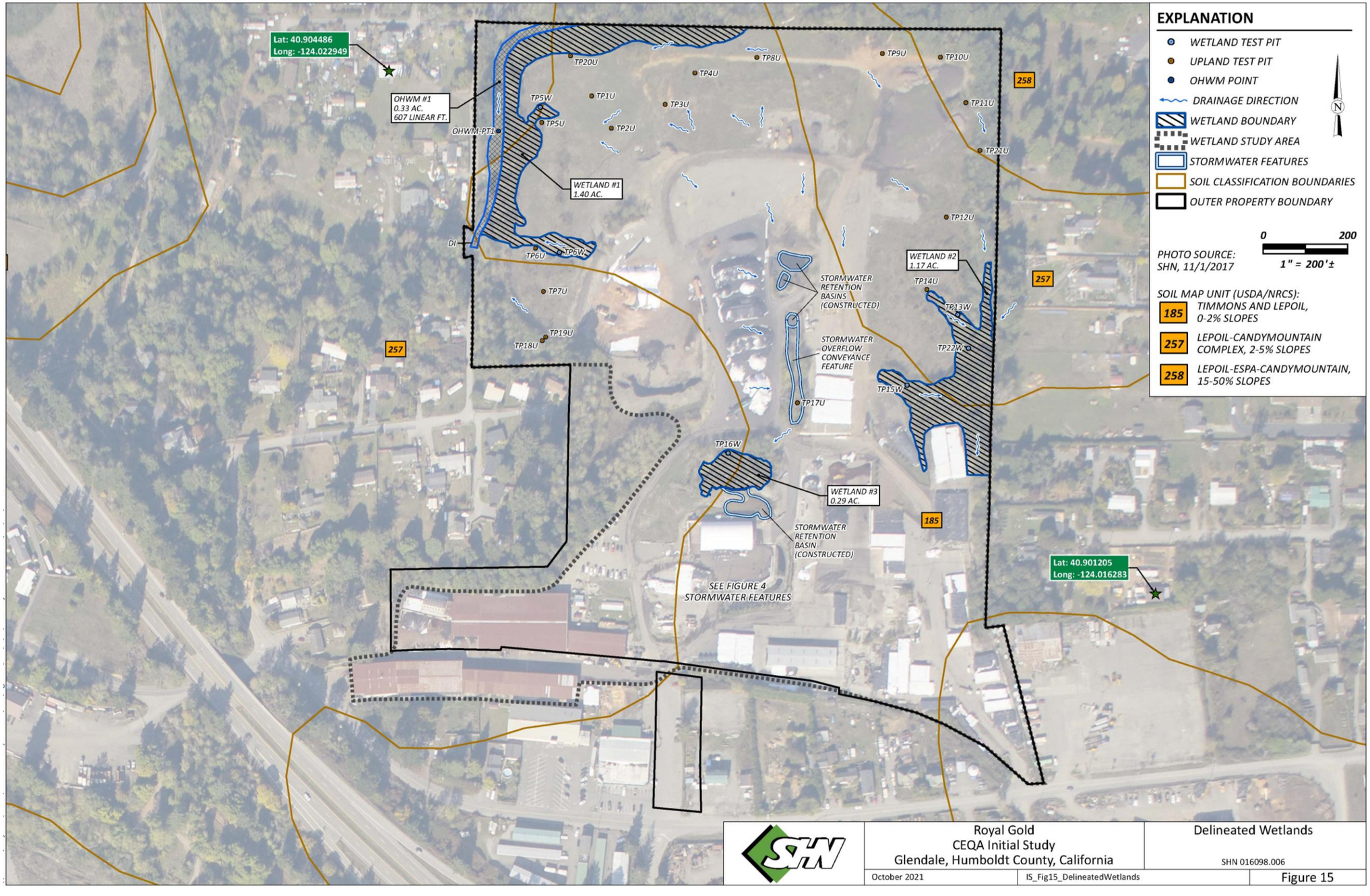
Freshwater emergent wetlands comprise the jurisdictional features across this site. These wetlands occur along the fringes of an industrial site, in areas that collect water and have not been disturbed since the closure of the mill. OHWM was observed within the drainageway along the northwestern border of the project area, within an excavated channel. Table 5 describes the wetland conditions found at each TP within the project area.

Table 5: Wetland Delineation and OHWM[1] Results

Aquatic Resource Name	Cowardian Type	Central Longitude/Latitude[2]	Area (acres)	Linear Length (linear feet)
Wetland #1	**PEM1C[3]**	40.904135°/ -124.021834°	1.40	N/A[4]
Wetland #2	**PEM1C**	40.902502°/-124.017995°	1.17	N/A
Wetland #3	**PEM1C**	40.901850°/-124.019936°	0.29	N/A
OHWM #1	**PEM1C**	40.904073°/-124.022016°	0.33	607
Total			**3.19[5]**	**607**

1. OHWM: Ordinary high water mark
2. In decimal degrees
3. Palustrine emergent persistent seasonally flooded
4. N/A=not applicable
5. The total wetland area reflects the wetlands existing at the time that the delineation occurred. It is estimated that approximately 3.4 acres of wetlands existed at the site in the baseline year (2009), a small portion of which were filled (0.21 acres) prior to the wetland delineation.

Figure 15: Delineated Wetlands



Analysis:

a) *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*
Less-than-significant with Mitigation Incorporated.

Special-status Botanical Species
Botanical surveys were conducted at the project site in 2017 and 2021 during the early and late season blooming periods. No special-status botanical species were observed within the study area during the survey effort. Although habitat exists onsite for six special-status plants, the habitat is of marginal value due to historical disturbance, high dominance by invasive species, and ongoing industrial use of the site. Therefore, it is not expected that the proposed project would result in any significant impacts to special-status botanical species.

Although the project is not expected to result in impacts to special-status botanical species, several recommendations for mitigation are provided in the Updated Biological Report (Appendix 5.5; SHN, 2021b) that, when implemented, will improve suitable habitat for special-status plants and will improve conditions at the project site for native botanical species in general. They include the following:

- Development of the wetland mitigation area in the northwestern portion of the site (see Appendix 5.7; SHN, 2020; incorporated under Mitigation Measure BR-1, below).
- The removal of invasive botanical species in several areas of the site (see Appendix 5.5; SHN, 2021b; incorporated under Mitigation Measure BR-2, below).
- The proposed wetland and riparian enhancement activities in several areas of the site (see Appendix 5.7; SHN, 2020 and Appendix 5.5: SHN, 2021b; incorporated under Mitigation Measure BR-2, below).

Where project-related development of the site is designed and situated so as to maintain a 50 foot setback from intermittent drainages and seasonal wetlands, as prescribed by the County SMAWO, it is expected that this will facilitate improved habitat conditions for special-status and native botanical species at the site.

Special-status Animal Species
Special-status animal surveys and a habitat assessment occurred at the project site in 2021 as part of the preparation of the Updated Biological Report. One special-status animal species was observed within the study area during the surveys – the northern red-legged frog. Northern red-legged frog egg masses were observed in pooled water in the northern portion of the study area (see Figure 14 – Study Area and Special-status Species Observations), which is proposed for wetland creation as mitigation for existing and proposed wetland impacts at the project site. There is also the potential for this species to occur within the existing and proposed stormwater detention basins at the site. Without mitigation, there is the potential for significant impacts to the northern red-legged frog from annual maintenance

activities in the stormwater detention basins and construction of the proposed improvements (for example, additional paving, wetland mitigation area, etc.). To minimize impacts to this species, Mitigation Measure BR-3 (seasonal restrictions on the maintenance of stormwater detention basins) and Mitigation Measure BR-4 (pre-construction surveys for special-status amphibians) are incorporated as mitigation for the proposed project. It is expected that with the implementation of these mitigation measures, potential impacts of the project would be reduced to less than significant. Although the improvements proposed at the project site (for example, additional paving) may remove small areas of suitable breeding habitat for this species in the northern portion of the site, the project includes the construction of a mitigation wetland at a 2:1 replacement ratio (see Mitigation Measure BR-1) that will increase the area of habitat available to the northern red-legged frog and other native amphibians. It is also expected that where observed, compliance with the 50-foot setbacks required by the County SMAWO for intermittent drainages and seasonal wetlands will improve habitat conditions for special-status and native amphibian species at the site.

A focused bat survey was not conducted as part of the survey efforts for the Biological Report. However, seasonal foraging habitat for the hoary bat (*Lasiurus cinereus*) exists within and adjacent to the project site and potential roosting habitat exists along the edges of the site. Due to the ongoing disturbance at the project site and more suitable undisturbed roosting habitat surrounding the site, this species is not likely to roost within the direct influence of the project. Project-related activities are not therefore anticipated to have a significant impact on this species or its habitat.

With the proposed mitigation measures, and in compliance with agency permitting requirements, the proposed project will not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS. Therefore, the proposed project would result in a less than significant impact with mitigation incorporated on this category of environmental effect.

b) *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*
Less-than-significant with Mitigation Incorporated.

Designated Critical Habitat
The project site does not contain designated critical habitat for species listed under the FESA. The CNDDB (CDFW, 2021b) reported that the nearest critical habitat is 0.16 miles away to the south (Hall Creek) and 0.25 miles to the west (Grassy Creek), specifically for the steelhead.

Due to the distance from the project site, the only potential impact the project could cause to this critical habitat is through stormwater runoff. Stormwater discharges from the central and eastern portions of the project site flow to the south through a series of stormwater drainage ditches and culverts on adjacent private property, which discharge into Hall Creek and ultimately the Mad River. The Royal Gold operation is subject to the authority of the

SWRCB. Pursuant to the Statewide General Permit for Storm Water Discharges Associated with Industrial Activities, SWRCB Order 2014-0057-DWQ (Industrial General Permit or IGP), businesses in specified Standard Industrial Classification (SIC) codes must implement the IGP. Royal Gold's operations are in SIC Code 2875 (Fertilizers, Mixing Only). Royal Gold complies with the IGP with a SWPPP (SHN, 2021c), which is periodically updated for current operational conditions. The company samples for stormwater characteristics and constituents including pH, total suspended solids (TSS), oil and grease (O&G), chemical oxygen demand (COD), nitrate + nitrite (nitrogen), total phosphorus, iron, aluminum, zinc, and lead. The primary stormwater pollutant constituents of concern and documented exceedances of the IGP Numeric Action Levels (NALs) at the Royal Gold site are iron, aluminum, nitrate + nitrite (nitrogen), TSS, and COD.

Humboldt Baykeeper filed a CWA lawsuit against Royal Gold in 2016, which resulted in a settlement agreement that expired in 2019. Per the settlement agreement, a number of stormwater improvements were constructed at the site including installing additional paving. Royal Gold continues to construct stormwater improvements throughout the site for improved stormwater management facilities and practices and to comply with the requirements of the IGP. Several of these improvements included upgrades to the stormwater infrastructure at the site that were installed by others during past industrial use. As discussed above, these improvements include the conversion of the southern central wetland area at the site into stormwater detention basins. These stormwater management improvements, as identified in the SWPPP BMP Location Map (see Figure 13 – SWPPP BMP Location Map), have resulted in significant reductions in the pollutant concentrations detected in stormwater discharging from the facility.

According to the stormwater sampling conducted at the Royal Gold site in December 2020 and April 2021, there were documented exceedances of the IGP NALs for iron (4.7 milligrams per liter [mg/L] vs. NAL of 1.0 mg/L) and aluminum (0.795 mg/L vs. NAL of 0.75 mg/L) in the runoff discharging from the site. All other stormwater pollutant constituents of concern were below the NALs, including the constituents with prior documented exceedances (nitrate + nitrite, TSS, and COD).

The NAL values in the current SWRCB IGP (2014) are derived from the benchmark monitoring thresholds in the 2008 EPA Multi-Sector General Permit (MSGP). The MSGP was recently reissued in January 2021, which included modifications to the benchmark monitoring thresholds for iron and aluminum. These modifications included, but are not limited to, the following:

- Removed the benchmark monitoring threshold for iron based on a lack of acute toxicity criteria; and
- Raised the aluminum benchmark monitoring threshold from 0.75 mg/L to 1.1 mg/L, based on current CWA Section 304(a) national recommended aquatic life water quality criteria.

As such, based on the latest scientific understanding, the NALs in the 2014 SWRCB IGP would be considered scientifically outdated. Although the 2014 IGP is administratively expired as of June 30, 2020, the SWRCB is not anticipating a reissuance of the IGP until

2023. At a minimum, the reissued IGP will institute NALs that are derived from and function similarly to the benchmark thresholds of the 2021 MSGP. Therefore, in the next iteration of the SWRCB IGP, iron is anticipated to be removed and the NAL for aluminum is anticipated to be increased to 1.1 mg/L. Based on the findings of a study prepared by the National Academies of Sciences, Engineering, and Medicine (NAS) in 2019, the modifications to the EPA MSGP would not compromise surface water quality standards (NAS, 2019). Therefore, the recent exceedances of the NALs for iron and aluminum at the Royal Gold facility would not result in exceedances of current water quality standards and would not be expected to cause significant impacts to the critical habitat along Hall Creek.

Although Royal Gold may not be exceeding current water quality standards, to improve the stormwater management practices at the facility and minimize potential impacts to adjacent critical habitat, the Updated Biological Report recommends that annual inspection and maintenance of the stormwater detention basins at the site be conducted. No potential for significant impacts from stormwater runoff have been identified. However, the facility continues to strive to continue to reduce discharges of iron and aluminum from the site. Mitigation Measure BR-5 establishes a required set of protocols for annual maintenance of all existing and proposed stormwater detention basins, addressing draining, sediment removal, and vegetation removal practices. It is expected that with continued compliance with the IGP and implementation of this mitigation measure, impacts from the project would be less than significant.

Vegetation Communities

One sensitive vegetation community (Red Alder Riparian Forest, sensitive vegetation community rank S2.2) was observed within the study area during the survey effort. This community includes the red alder-dominated areas along the intermittent drainage in the northwestern portion of the site. This drainage was delineated as containing an ordinary high-water mark (SHN, 2018c). These areas are primarily composed of red alder saplings and are not high-quality examples of this vegetation community, but rather represent a transition from maintained drainage ditches to more natural plant communities. These areas will be protected by compliance with the SMA setback standards of the County's SMAWO and consequently will not be impacted by the project. To mitigate for encroachments into SMAs in other portions of the site, Mitigation Measure BR-2 is incorporated, which requires Royal Gold to conduct riparian enhancement along the northwestern drainage (see Figure 16 – Mitigation Measures Proposed for SMA Encroachments). The riparian enhancement activities will improve habitat conditions along the northwestern drainage for native plants.

Several vegetation communities surround the project site, including upland mixed conifer forests to the north of the project site and riparian woodlands along the Mad River and its tributaries (for example, Hall Creek) to the southeast of the project. It is not anticipated that any of the surrounding vegetation communities will be impacted by the improvements and activities at the Royal Gold facility.

Wetland and Riparian Habitats

As indicated on Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year (2009), onsite wetland and riparian habitats consist of seasonal wetlands that occur within the

northwestern and central portions of the project site and several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site. The seasonal wetlands and intermittent drainages at the site provide potential habitat for a variety of wildlife including amphibians and nesting birds. In addition, isolated pools of seasonal water in the undeveloped grassland areas in the northern portion of the site provide temporary amphibian breeding habitat. Some of the stormwater management features at the site also may provide temporary habitat for wildlife, including aquatic species. The stormwater management features at the site are illustrated in Figure 13 – SWPPP BMP Location Map. The riparian corridor and wetland complex in the northwest portion of the site provides the highest quality habitat for wildlife breeding, foraging, and movement.

When Royal Gold moved to the site in 2009, it is estimated there were approximately 3.4 acres of wetlands remaining at the project site (see Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year [2009]). Since 2009, Royal Gold has impacted approximately 0.83 acres of wetlands at the site. This includes the wetlands in the central southern portion of the site that were converted to stormwater detention basins or filled for use as paving, parking, storage, and coco processing (see Figure 12 – Site Plan with Baseline Year [2009] Streamside Management Areas and Figure 17 – Impacted Areas; SHN, 2020). As part of full buildout of their facility, Royal Gold is proposing to impact approximately 0.74 acres of additional wetlands in the central eastern portion of the site (see Figure 12 – Site Plan with Baseline Year [2009] Streamside Management Area and Figure 17 – Impacted Areas; SHN, 2020). This additional wetland area is proposed to be converted to stormwater detention basins or filled and developed as paving, storage areas, stormwater swales, and earthen berms. Therefore, of the 3.4 acres of wetlands onsite in 2009, 1.57 acres have been impacted or are proposed to be impacted by improvements at the Royal Gold facility. Royal Gold is proposing to mitigate the existing and proposed wetland impacts at a 2:1 replacement ratio through the construction of a mitigation wetland in the northwestern portion of the site. This is incorporated as Mitigation Measure BR-1 and would result in the creation of a 3.18-acre wetland mitigation area (see Figure 18 – Mitigation Area Map; SHN, 2020). The wetland mitigation area will be contoured and planted with native wetland vegetation to create wetlands of equal or greater value than those impacted by the improvements at the Royal Gold facility. As a result of the proposed wetland mitigation, the total wetland area at the site will be increased by approximately 1.6 acres (from 3.4 acres to 5 acres) relative to the existing wetland area present when Royal Gold moved to the site in 2009. Additionally, the proposed wetland mitigation will concentrate the wetland habitat in the northwestern portion of the site adjacent to a large riparian/wetland complex, which is the highest quality habitat for wildlife at the site. The 50-foot SMA for the wetland mitigation area is also proposed to be planted with native botanical species to provide habitat screening and protect the created wetland habitat from disturbance. This is incorporated under Mitigation Measure BR-2.

Pursuant to Humboldt County Code Section 314-61.1 (SMAWO), 50-foot buffers are prescribed around seasonal wetlands and intermittent drainages such as those found at the project site. The SMAWO differentiates between natural and human-made drainage features. Development setbacks are not prescribed from features that consist entirely of a drainage ditch, culvert, or similar device, construction, or system. As such, SMAs do not apply to the stormwater management features at the site (see Figure 13 – SWPPP BMP Location Map).

All development within or affecting SMAs, wetlands, or other wet areas not exempted under County Code Section 314-61.1.4, requires a Special Permit from the County. Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year (2009) shows the SMA boundaries that are estimated to have applied in 2009 when Royal Gold moved to the site. Due to the existing improvements and disturbed condition of the site from past industrial activity (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]), at that time the SMA boundaries surrounding the drainages and wetlands contained limited habitat value. Much of the SMA boundaries contained pavement, stormwater improvements, compacted gravel surfaces, graded and compacted soils, and/or non-native, invasive vegetation. These conditions likely did not support special-status animal use of the area for shelter, foraging, or nesting.

Since moving to the site in 2009, Royal Gold has constructed several improvements to accommodate the needs of their business including, but not limited to, additional paving, two new buildings (arch-truss design consisting of steel tube trusses and polyethylene fabric covers), stormwater features (for example, detention basins, bioswales, etc.), security fencing, utility infrastructure, and the construction of earthen berms with imported fill and aggregate material (see Figure 6 – Site Plan). As discussed above, improvements to the site have included the conversion of the wetlands in the southern central portion of the site to stormwater detention basins and the filling of some of these wetlands for use as paving, parking, storage, and coco processing (see Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline year [2009] and Figure 12 – Site Plan with Baseline Year [2009] Streamside Management Areas). Several improvements constructed by Royal Gold also encroach into the SMA boundaries that are estimated to have been applicable in 2009. An after-the-fact Special Permit is required from the County of Humboldt for improvements that Royal Gold has constructed within SMAs since they moved to the site in 2009. A Special Permit is also required for some of the improvements that Royal Gold is proposing as part of the full buildout of their facility that will encroach into SMAs. As indicated in Figure 12 – Site Plan with Baseline Year (2009) Streamside Management Areas, the encroaching improvements (existing and proposed) include new buildings, paving, earthen berms, water tanks, parking, stormwater management features, a coco processing area, and storage areas. Figure 19 – Site Plan with Streamside Management Areas at Full Buildout shows the modified SMAs that are proposed for full buildout of the facility. This includes an expansion of the SMA in the northwestern portion of the site and reductions along the eastern and southeastern boundaries. Some of the proposed SMA reductions are intended to reflect areas with existing improvements (for example, paving, stormwater improvements, etc.) constructed during past industrial use of the property.

As previously discussed, the habitat value present within the SMAs at the site in 2009 was fairly limited due to the existing improvements and disturbed condition of the site from past industrial activity. However, to mitigate for the existing and proposed encroachments into the SMAs at the project site, Royal Gold is proposing several habitat enhancements including the following: 1) enhancement of two existing wetland areas at the site; 2) enhancement of the riparian corridor along the northwestern boundary of the site; 3) invasive species removal in two areas at the site; and 4) security fencing along the western boundary of the site to prevent trespassing from adjacent residents and further degradation of the riparian corridor

and wetlands. This is incorporated as Mitigation Measure BR-2. The location of the proposed habitat enhancements is shown in Figure 16 – Mitigation Measures Proposed for SMA Encroachments and further detail is provided in the Updated Biological Report (see Appendix 5.5; SHN, 2021b). It is expected that with the implementation of these mitigation measures, impacts of the project from SMA encroachments would be reduced to less than significant.

With implementation of the wetland and habitat enhancement mitigations, and compliance with the prescriptive standards of the County's SMAWO, where possible, it is expected that there will be a net increase in wetland and riparian habitat at the project site. Habitat conditions will also be improved as the mitigation wetland will provide higher quality wetlands than the isolated wetlands impacted and will be located adjacent to the existing riparian/wetland complex in the northwestern portion of the site, improving movement to and from the mitigation wetland. The increase in habitat quantity and quality is expected to improve site conditions for breeding amphibians and improve foraging habitat for other native wildlife.

Nesting Bird Habitat

Although low-quality relative to surrounding areas that are less disturbed and do not have ongoing industrial activity, there is nesting bird habitat for several bird species at the project site. Therefore, without mitigation, there is the potential for significant impacts to nesting birds during construction of the proposed improvements at the Royal Gold facility. To minimize impacts to nesting bird species, a requirement to conduct pre-construction surveys for nesting birds is incorporated as Mitigation Measure BR-6. It is expected that with the implementation of this mitigation measure, potential impacts of the project would be reduced to less than significant.

With the proposed mitigation measures, and in compliance with agency permitting requirements, the proposed project will not have a substantial adverse effect on any riparian habitat or other sensitive natural community in local or regional Plans, polices, or regulations, or by the CDFW or USFWS. Therefore, the proposed project would result in a less than significant impact with mitigation incorporated on this category of environmental effect.

Figure 16: Mitigation Measures Proposed for SMA Encroachments

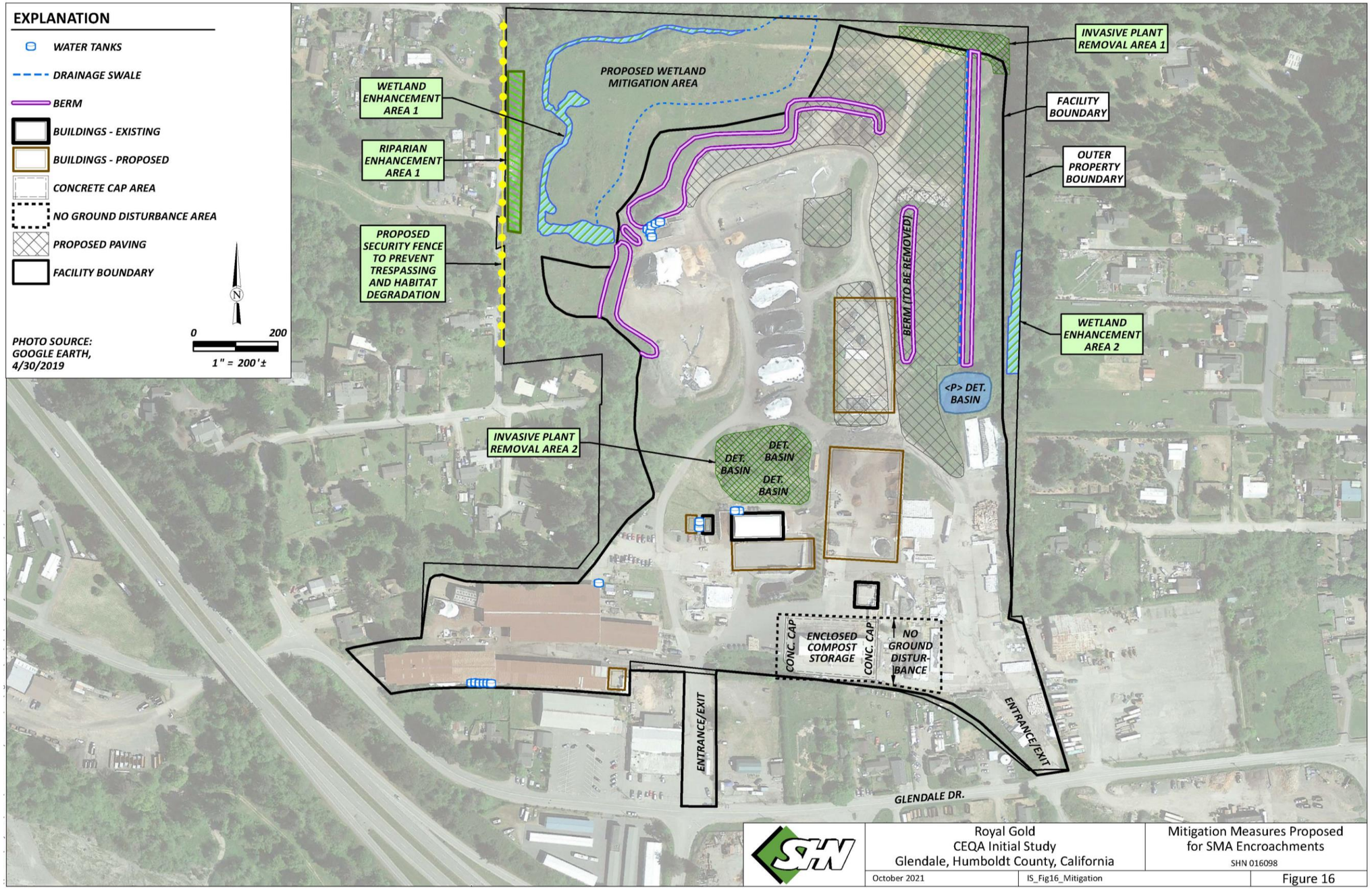


Figure 17: Impacted Areas

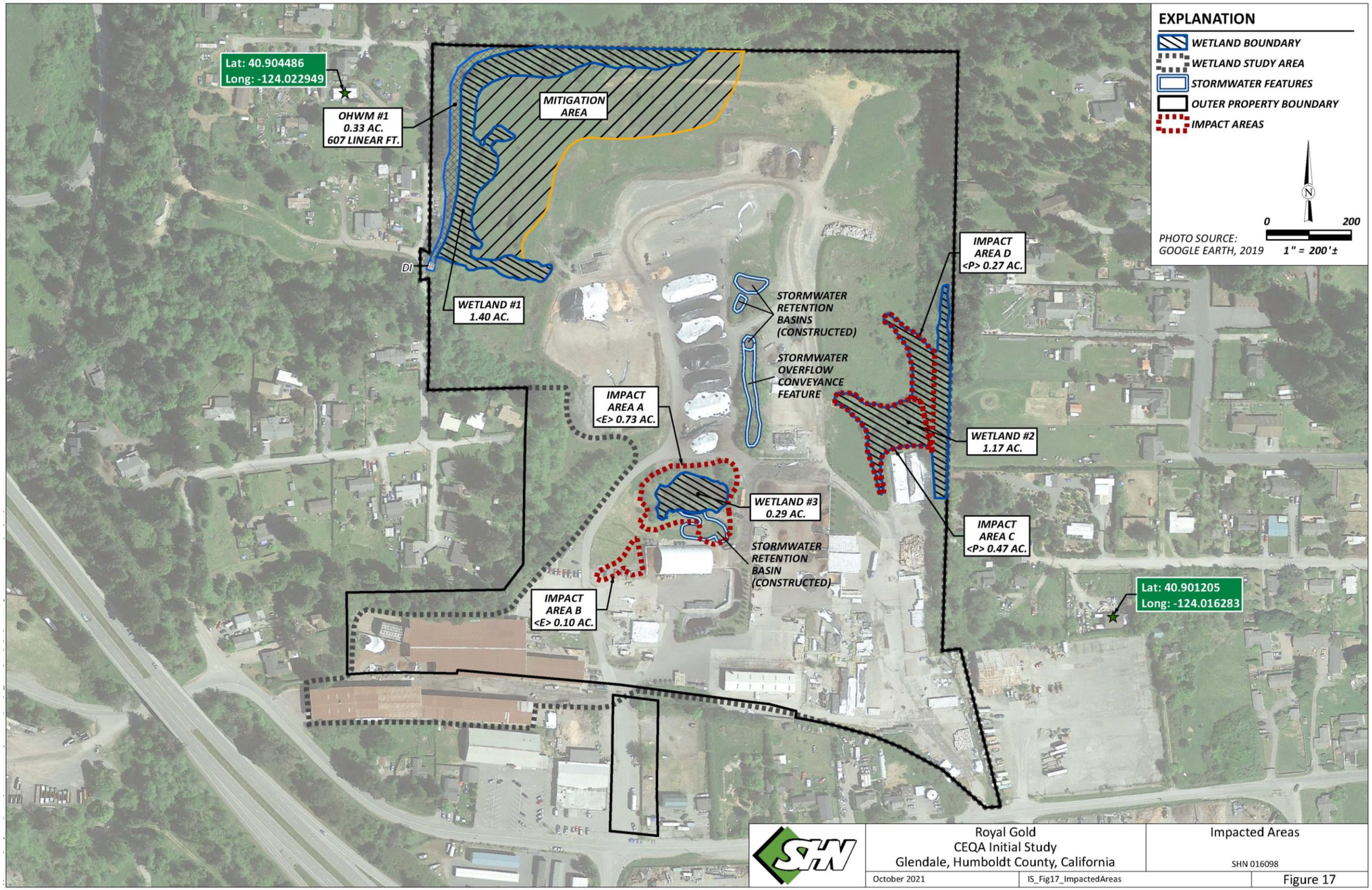


Figure 18: Mitigation Area Map

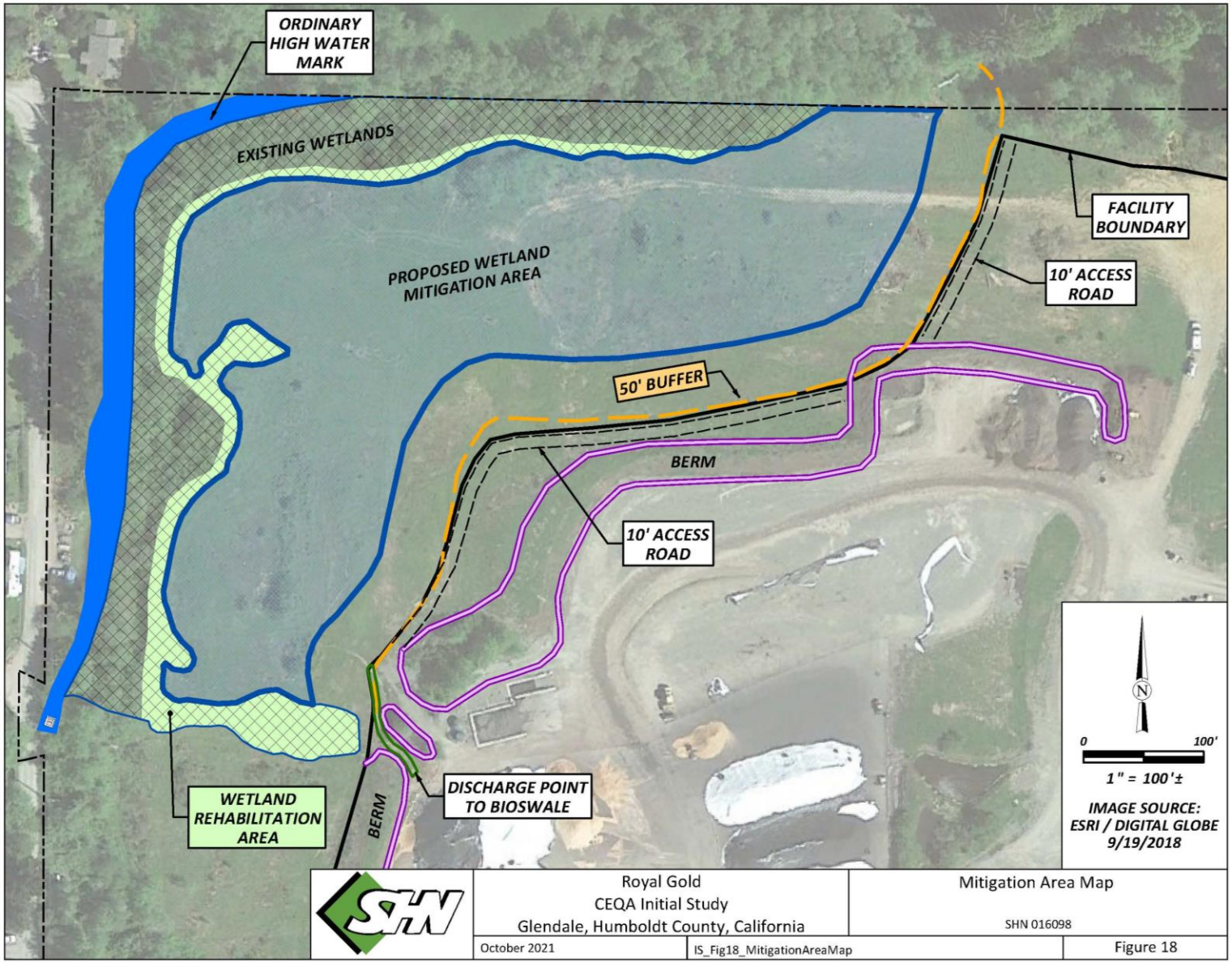
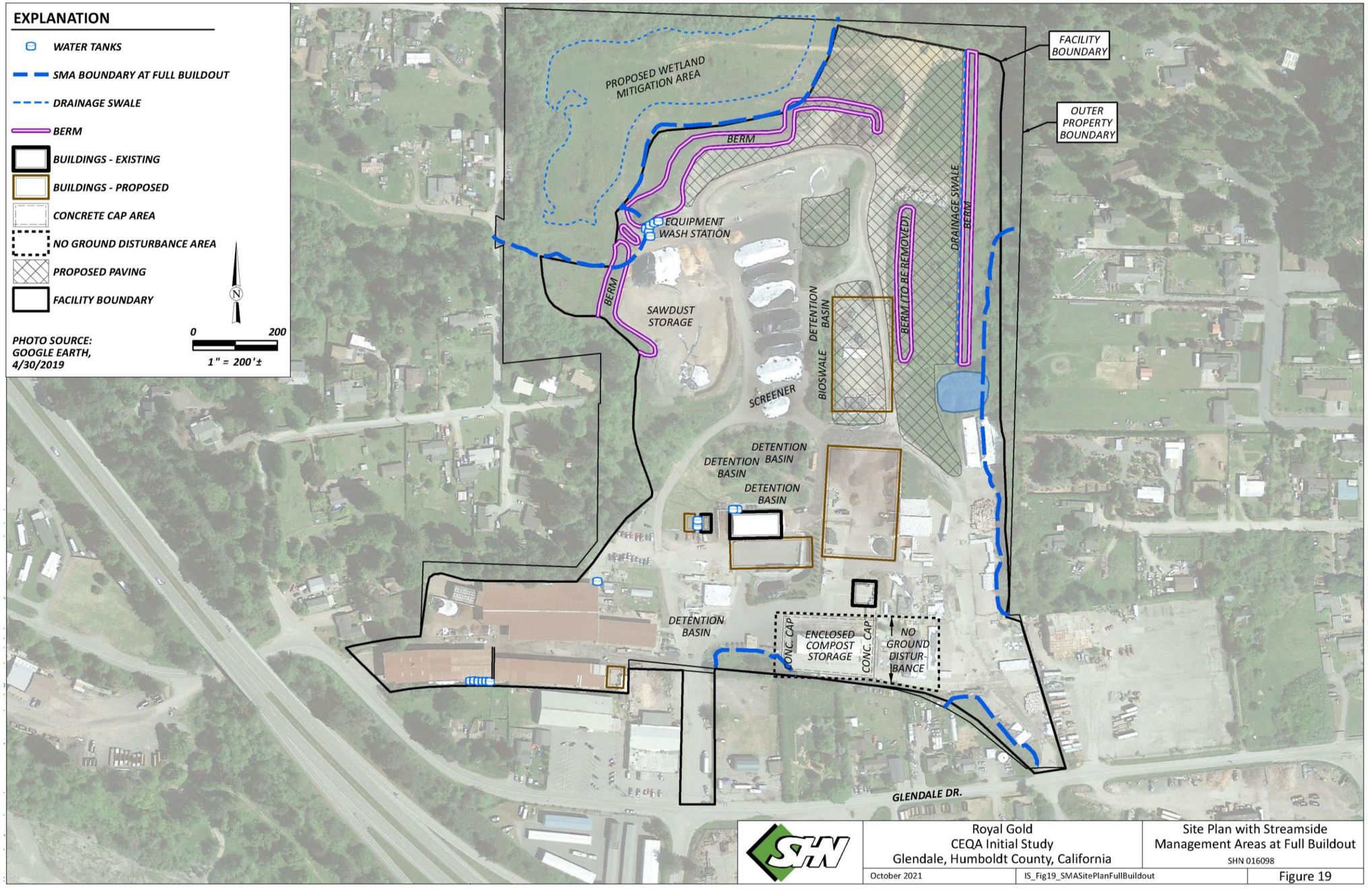


Figure 19: Site Plan with Streamside Management Areas at Full Buildout



c) *Have a substantial adverse effect on state or federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?* **Less-than-significant with Mitigation Incorporated.**

As indicated on Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year (2009), onsite wetland and riparian habitats consist of seasonal wetlands that occur within the northwestern and central portions of the project site and several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site.

When Royal Gold moved to the site in 2009, it is estimated there were approximately 3.4 acres of wetlands at the project site (see Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year [2009] and Figure 17 – Impacted Areas); SHN, 2021b). Since 2009, Royal Gold has impacted approximately 0.83 acres of wetlands at the site. This includes the wetlands in the central southern portion of the site that were converted to stormwater detention basins or filled for use as paving, parking, storage, and coco processing (see Figure 12 – Site Plan with Baseline Year [2009] Streamside Management Areas and Figure 17 – Impacted Areas; SHN, 2020). As part of full buildout of their facility, Royal Gold is proposing to impact approximately 0.74 acres of additional wetlands in the central eastern portion of the site (see Figure 12 – Site Plan with Baseline Year [2009] Streamside Management Area and Figure 17 – Impacted Areas; SHN, 2020). This additional wetland area is proposed to be converted to stormwater detention basins or filled and developed as paving, storage areas, stormwater swales, and earthen berms. Therefore, of the 3.4 acres of wetlands onsite in 2009, 1.57 acres have been impacted or are proposed to be impacted by improvements at the Royal Gold facility. Royal Gold is proposing to mitigate the existing and proposed wetland impacts at a 2:1 replacement ratio through the construction of a mitigation wetland in the northwestern portion of the site. This is incorporated as Mitigation Measure BR-1 and would result in the creation of a 3.18-acre (138,520 s.f.) wetland mitigation area (see Figure 18 – Mitigation Area Map; SHN, 2020).

Table 6. Total Wetland Mitigation Area Data

Impact Area	Surface Area (SF)[1]	Mitigation Area Proposed	Location	Coordinates
A	31,802	63,604	Central	40.901949°, -124.019869°
B	4,338	8,676	Central	40.901671°, -124.020537°
C	21,359	42,718	Central East	40.902401°, -124.018230°
D	11,761	23,522	Central East	40.902861°, -124.018024°
Total	**69,260**	**138,520**	-	

SF: square feet

The wetland mitigation area will be contoured and planted with native wetland vegetation to create wetlands of equal or greater value than those impacted by the improvements at the Royal Gold facility. As a result of the proposed wetland mitigation, the total wetland area at the site will be increased by approximately 1.6 acres (from 3.4 acres to 5 acres) relative to the existing wetland area present when Royal Gold moved to the site in 2009. Additionally, the proposed wetland mitigation will concentrate the wetland habitat in the northwestern portion

of the site adjacent to a large riparian/wetland complex, which is the highest quality habitat for wildlife at the site. The 50-foot SMA for the wetland mitigation area is also proposed to be planted with native botanical species to provide habitat screening and protect the created wetland habitat from disturbance. This is incorporated under Mitigation Measure BR-2.

With the proposed mitigation measures, the proposed project will not have a substantial adverse effect on state or federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. Therefore, the proposed project would result in a less than significant impact with mitigation incorporated on this category of environmental effect.

d) *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*
Less-than-significant with Mitigation Incorporated.

The riparian, wetland, and forested areas along the perimeters of the site provide adequate wildlife movement corridors between higher quality habitat areas surrounding the site (see Figure 14 – Study Area and Special-status Species Observations). During the 2021 animal surveys, it was observed that there is a well-established trail on the northern and eastern boundaries of the site with signs of Roosevelt elk (scat), racoon (prints), and gray fox (prints). The riparian corridor and wetland complex in the northwest portion of the site also functions as an important wildlife movement corridor. The Updated Biological Report (SHN, 2021b) recommends that these established corridors should be preserved to allow continued wildlife movement.

In the Royal Gold Plan of Operations (Royal Gold, 2021), it is proposed to construct additional security fencing at the site to prevent trespassing, vandalism, and theft. Royal Gold has indicated that the security fencing is primarily proposed along the western boundary of the site where most of the trespassing occurs by adjacent residents. If not designed properly, any fencing constructed in the northern portion of the site has the potential to inhibit use of the existing wildlife corridors. Therefore, without mitigation, there is the potential that the project would interfere with local wildlife movements. Barbed wire can snag animals and tangle legs, especially if wires are loose or spaced too closely together. Elk typically cannot jump a fence over 3.5 feet, but adult deer are capable of jumping a 6-foot fence. A minimum 12-inch spacing between the top two wires will be sufficient to prevent adult ungulate mortalities. At least the top wire should be smooth rather than barbed. Frightened ungulates, diving raptors, and other low-flying birds frequently strike wire fences simply because they do not see them. Attaching durable flagging or other markers to the fence can increase its visibility (Paige, 2008). To minimize potential impacts to wildlife movement at the site, Mitigation Measure BR-7 is incorporated, which identifies fencing design recommendations to allow for the continued movement of wildlife through the established wildlife corridors at the project site, without entrapment or entanglement. It is expected that with the implementation of this mitigation measure, that potential impacts of the project would be reduced to less than significant.

With the proposed mitigation measure, the proposed project will not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. Therefore, the proposed project would result in a less than significant impact with mitigation incorporated on this category of environmental effect.

e) *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*
Less-than-significant with Mitigation Incorporated.

As already described, the SMAWO includes 50-foot buffers around seasonal wetlands and intermittent drainages such as those found at the project site. The SMAWO also differentiates between natural and human-made drainage features. Development setbacks are not prescribed from features that consist entirely of a drainage ditch, culvert, or similar device, construction, or system. As such, SMAs do not apply to the stormwater management features at the site (see Figure 13 – SWPPP BMP Location Map). All development within or affecting SMAs, wetlands, or other wet areas not exempted under County Code Section 314-61.1.4, requires a Special Permit from the County.

Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year (2009) shows the SMA boundaries that are estimated to have applied in 2009 when Royal Gold moved to the site. Due to the existing improvements and disturbed condition of the site from past industrial activity (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]), at that time the SMA boundaries surrounding the drainages and wetlands contained limited habitat value. Much of the SMA boundaries contained pavement, stormwater improvements, compacted gravel surfaces, graded and compacted soils, or non-native, invasive vegetation. These conditions likely did not support special-status animal use of the area for shelter, foraging, or nesting.

Since moving to the site in 2009, Royal Gold has constructed several improvements to accommodate the needs of their business, including, but not limited to, additional paving, two new buildings (arch-truss design consisting of steel tube trusses and polyethylene fabric covers), stormwater features (for example, detention basins, bioswales, etc.), security fencing, utility infrastructure, and the construction of earthen berms with imported fill and aggregate material (see Figure 6 – Site Plan). As discussed above, improvements to the site have included the conversion of the wetlands in the southern central portion of the site to stormwater detention basins and the filling of some of these wetlands for use as paving, parking, storage, and coco processing (see Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline year [2009] and Figure 12 – Site Plan with Baseline Year [2009] Streamside Management Areas). Several improvements constructed by Royal Gold also encroach into the SMA boundaries that are estimated to have been applicable in 2009. An after-the-fact Special Permit is required from the County of Humboldt for improvements that Royal Gold has constructed within SMAs since they moved to the site in 2009. A Special Permit is also required for some of the improvements that Royal Gold is proposing as part of the full buildout of their facility that will encroach into SMAs. As indicated in Figure 12 –

Site Plan with Baseline Year (2009) Streamside Management Areas, the encroaching improvements (existing and proposed) include new buildings, paving, earthen berms, water tanks, parking, stormwater management features, a coco processing area, and storage areas. Figure 19 – Site Plan with Streamside Management Areas at Full Buildout shows the modified SMAs that are proposed for full buildout of the facility. These include an expansion of the SMA in the northwestern portion of the site and reductions along the eastern and southeastern boundaries. Some of the proposed SMA reductions are intended to reflect areas with existing improvements (for example, paving, stormwater improvements, etc.) constructed during past industrial use of the property.

As discussed above, the habitat value present within the SMAs at the site in 2009 was fairly limited due to the existing improvements and disturbed condition of the site from past industrial activity. However, to mitigate for the existing and proposed encroachments into the SMAs at the project site, Royal Gold is proposing several habitat enhancements including the following: 1) enhancement of two existing wetland areas at the site; 2) enhancement of the riparian corridor along the northwestern boundary of the site; 3) invasive species removal in two areas at the site; and 4) security fencing along the western boundary of the site to prevent trespassing from adjacent residents and further degradation of the riparian corridor and wetlands. This is incorporated as Mitigation Measure BR-2. The location of the proposed habitat enhancements is shown in Figure 16 – Mitigation Measures Proposed for SMA Encroachments and further detail is provided in the Updated Biological Report (see Appendix 5.5; SHN 2021b).

With the proposed mitigation measures, the proposed project will not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Therefore, the proposed project would result in a less than significant impact with mitigation incorporated on this category of environmental effect.

f) *Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?* **No Impact**.

The project site is not located within the boundaries of a Habitat Conservation Plan. The Humboldt County General Plan Revised Draft Environmental Impact Report (EIR) (Humboldt County, 2017c), Chapter 3.11 Biological Resources, lists five Habitat Conservation Plans (HCP) in Humboldt County: 1) Green Diamond Resource Company California Timberlands (formerly Simpson Timber Company) Northern Spotted Owl HCP; 2) Regli Estates HCP; 3) Pacific Lumber Company (now Humboldt Redwoods Company) HCP; 4) Green Diamond Resource Company, 2007 Aquatic HCP/Candidate Conservation Agreement; and 5) Humboldt Bay Municipal Water District HCP.

According to CDFW's California Natural Community Conservation Plans map, the project site is not located in the boundaries of a Natural Community Conservation Plan (CDFW, 2021e). No Natural Community Conservation Plans are listed for Humboldt County.

In summary, the proposed project will not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Plan, or other approved plan applicable to the project area. Therefore, the proposed project will result in no impact on this category of environmental effect.

Mitigation Measures:

BR-1. Wetland Mitigation: To mitigate for existing and proposed impacts to approximately 1.57 acres of wetland area at the project site, Royal Gold shall implement the Wetland Mitigation and Monitoring Plan (WMMP) Addendum 1 (see Appendix 5.7; SHN, 2020). Wetland creation shall be documented within an "As Constructed" report recording grading depths, vegetation planted (number and species), and hydrology observed following the first soaking rains. Permanent monitoring plots representative of conditions (along transects capturing the differing elevations and wetland types being developed) will be established as part of this effort with permanent markers and GPS data to ensure the plot locations are found in subsequent monitoring years. Plots must be of a number and orientation so as to capture all wetland design conditions present throughout the wetland mitigation area and should be a statistically significant representation of the mitigation area. This will be used as the post-construction baseline from which to gauge the trajectory of wetland habitat development. Wetland creation success criteria and monitoring requirements shall include the following:

- Successful wetland mitigation shall be defined as the creation of three-parameter wetlands throughout the wetland mitigation area after a period of five years. Wetland mitigation should result in a mosaic of seasonally and permanently saturated wetland types similar to the hydrology observed within the impacted wetlands as described in the WMMP.
- All wetland monitoring shall be conducted during the rainy season after a minimum of ten inches have accumulated locally. Wetland monitoring shall be conducted concurrently with and in addition to the vegetation monitoring described in the WMMP.
- Wetland vegetation and hydrology shall be assessed in year three. Both hydrophytic vegetation dominance and wetland hydrology indicators shall be recorded from each of the permanent plots established in the "As Constructed" report. Conditions shall be recorded on Army Corps of Engineers (ACOE) Wetland Determination Data Forms and will use the same metrics to determine vegetation dominance and wetland hydrology indicators.
- All permanent plots will be investigated for all three wetland parameters in year five to determine the success of the wetland mitigation effort. This will include wetland test pits, which will be investigated using the ACOE wetland delineation methods.

BR-2. Habitat Enhancements for Encroachment into Streamside Management Areas (SMAs): To mitigate for existing and proposed encroachments into the SMAs at the project site, the following habitat enhancements shall be implemented. The location of the proposed habitat enhancements is shown in Figure 16 – Mitigation Measures Proposed for SMA Encroachments.

- Wetland Enhancement Area 1: This habitat enhancement involves enhancement of approximately 19,166 sf of lesser-functioning wetlands on the edge of the wetland complex in the northwest portion of the site (see Figure 16 – Mitigation Measures Proposed for SMA Encroachments). The enhancement activities include the removal of non-native botanical species and planting of freshwater emergent wetland plants including Pacific willow (*Salix lasiandra* var. *lasiandra)*, arroyo willow (*Salix lasiolepis)*, Douglas spirea (*Spirea douglasii*), salmonberry (*Rubus spectabilis*), common rush (*Juncus effusus* ssp. *Pacificus)*, spreading rush (*Juncus patens*), panicled bulrush (*Scirpus microcarpus*), tall flatsedge (*Cyperus eragrostis*), slough sedge (*Carex obnupta*), brownhead rush (*Juncus phaeocephalus*), and arctic sweet colt's foot (*Petasites frigidus)*. The planting recommendations for this area are included in the Wetland Mitigation and Monitoring Plan (SHN, 2019b), which is attached to the Wetland Mitigation and Monitoring Plan Addendum 1 (see Appendix 5.7; SHN, 2020).

- Wetland Enhancement Area 2: This habitat enhancement involves enhancement of approximately 6,568 sf of lesser-functioning wetlands on the eastern boundary of the site (see Figure 16 – Mitigation Measures Proposed for SMA Encroachments). This includes a portion of the wetland area that would be remaining after the improvements are completed for full buildout of the Royal Gold facility. The enhancement activities include the removal of non-native plant species and planting of similar freshwater emergent wetland plants to what is proposed for Wetland Enhancement Area 1. The planting recommendations in the Wetland Mitigation and Monitoring Plan (SHN, 2019b) would also be applied to Wetland Enhancement Area 2 (see Appendix 5.7; SHN, 2020).

- Riparian Enhancement Area 1: This habitat enhancement would involve enhancement of a 12,854 s.f. portion of the riparian corridor in the northwestern portion of the site (see Figure 16 – Mitigation Measures Proposed for SMA Encroachments) that has been impacted by adjacent residents to the west of the Royal Gold facility. The impacts that have occurred to this area of the site have included dumping of trash, abandonment of vehicles, spilling of oils and fuels, erosion and sedimentation, and the construction of unpermitted stream crossings, culverts, and berms/impoundments. The enhancement activities would include the removal of trash and sources of contamination in and around the stream channel, stabilization of stream channel erosion, the removal of unpermitted stream crossings, culverts, and berms/impoundments, removal of invasive plant species, and the planting of native plant species. Native plant species that would be planted in this area include those found within the lesser disturbed portions of the stream such as slough sedge (*Carex obnupta)*, common rush (*Juncus effusus* ssp. *Pacificus*), water parsley (*Oenanthe sarmentosa*), and skunk cabbage (*Lysichiton americanus*).

- Invasive Species Removal Area 1: This habitat enhancement includes the removal and continued management of invasive plant species in an approximately 14,444 sf area in the northeastern corner of the site. The plant species to be targeted for removal include scotch broom (*Cytisus scoparius*) and pampas grass (*Cortaderia jubata*). This enhancement activity will minimize the potential for the spread of this invasive plant species at the project site and on adjacent properties to the north and east.

- Invasive Species Removal Area 2: This habitat enhancement includes the removal and continued management of invasive plant species in an approximately 36,332 sf area in and around the central stormwater detention basins at the site. The plant species to be targeted for removal include scotch broom (*Cytisus scoparius*) and pampas grass (*Cortaderia jubata*). This enhancement activity will minimize the potential for the spread of this invasive plant species at the project site, at downstream locations, and offsite.

- Security Fencing: Similar to the concept behind the use of livestock exclusionary fencing to protect riparian and wetland areas, security fencing shall be constructed along the western boundary of the site to prevent continued trespassing by adjacent residents and further degradation of the riparian corridor and wetlands in the northwest portion of the site. The alignment of the proposed fencing is shown in Figure 16 – Mitigation Measures Proposed for SMA Encroachments. The security fencing will increase the likelihood of success for the enhancement activities proposed for Riparian Enhancement Area 1.

After completion of the proposed habitat enhancements, an "As Planted Report" will be prepared to document the removal of invasive species and/or the planting of native species. The Report will identify the location and type of invasive species removed from the lesser-functioning habitat areas at the site that are identified above and shown on Figure 16 – Mitigation Measures Proposed for SMA Encroachments. The Report will also identify the native species planted, planting locations, and number of individuals planted. The "As Planted Report" will document the baseline conditions and criteria for assessing percent survival of native plantings and the success of invasive species removal. Local reference sites for invasive species removal success criteria will be identified in the Report, which will include undisturbed wetland, riparian, and upland habitat areas (as applicable to the type of habitat enhancement proposed). The "As Planted Report" will be submitted for review and approval by all permitting agencies with jurisdiction.

To determine the success of the proposed habitat enhancements, both quantitative and qualitative sampling will be performed by a qualified professional. With the exception of the proposed security fencing, monitoring will occur in years 1, 3, and 5 after completion of the proposed habitat enhancements. The monitoring activity will be documented in monitoring reports that will be submitted for review and approval by all permitting agencies with jurisdiction. Any mortality of native plantings within the initial 3 years of the monitoring period will be replanted to achieve an 85 percent survival success rate by the end of the monitoring period. If the invasive species removal success criteria are not being met by year 3 of the monitoring period, additional invasive plant removal activities will be conducted to achieve conditions substantially similar to the local reference sites by the end of the monitoring period. Any replanting of native species or additional invasive species removal required to achieve the success criteria will be documented in the monitoring reports.

BR-3. Seasonal Restrictions on Maintenance of Stormwater Detention Basins:
Maintenance activities including dredging and aquatic plant removal shall occur outside the breeding and development season for special-status amphibians such as the northern red-legged frog. Maintenance activities shall occur between June 1 and October 15. If dewatering is required as part of maintenance activities, pump intakes shall be covered with 0.125-inch mesh to prevent

entrapment of amphibians. If stormwater detention basin maintenance occurs between June 1 and August 31, nesting bird surveys should be conducted prior to maintenance activities according to the methods outlined in Mitigation Measure BR-6 – Nesting Bird Surveys.

BR-4. Special-status Amphibian Surveys: If construction or routine maintenance activities that involve grading or other ground disturbance begin during the breeding season (generally October 16 to May 31), a qualified biologist shall conduct diurnal Visual Encounter Surveys (VES) for special-status amphibian species within and immediately adjacent to the project area(s) no more than three days prior to activities. If egg masses or tadpoles are located during the survey, one of the following protective measures shall be implemented:

- Do not commence construction or routine maintenance activities that involve grading or other ground disturbance until after May 31; or
- Monitoring shall be done by a qualified biologist every seven days until amphibians have metamorphosed to subadults (or experience natural mortality); or
- Non-listed* special-status aquatic species (egg masses or larval-stage) shall be relocated outside the area of impact to an appropriate location, in consultation with CDFW, by a qualified biologist prior to construction activities. (*Threatened, Endangered, or Candidate species cannot be relocated without an Incidental Take Permit from CDFW).

BR-5. Annual Detention Basin Maintenance Protocol: The following stormwater detention basin maintenance shall be implemented annually during the specified seasonal window (June 1 to October 15) for all existing and proposed stormwater detention basins:

- Beginning after June 1 (to ensure that there are no significant impacts to amphibian species), all stormwater detention basins on the facility shall be drained if water is still present. During draining, pump intakes shall be covered with 0.125-inch mesh to prevent entrapment of amphibians.

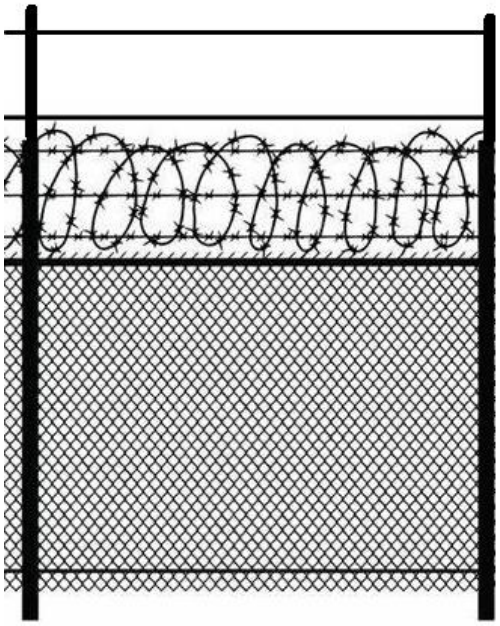
- If special-status aquatic animals are encountered during detention basin maintenance (for example, Northern red-legged frog), non-listed* special-status aquatic animal species shall be relocated by a qualified biologist outside the area of impact to an appropriate location, in consultation with CDFW. (*Threatened, Endangered, or Candidate species cannot be relocated without an Incidental Take Permit from CDFW, although no listed species are expected to be encountered in the stormwater basins).

- Once the detention basins have dried up, they shall be inspected for sediment accumulation.

- If sediment requires removal, that shall be completed prior to October 1st.

- Vegetation shall be thinned at the time of sediment removal depending on the species. The focus shall be on removing fast-growing floating aquatic plants and other fleshy wetland plants.

BR-6. <u>Nesting Bird Surveys</u>: If construction activities begin during the bird nesting season (generally March 15 to August 31), a qualified biologist shall conduct nest surveys no more than seven days prior to activities, within the construction limits and within 100 feet (200 feet for raptors) of the construction limits. If an active nest is located during the survey, the following protective measures shall be implemented:



- A no-disturbance buffer shall be established around the nest by the qualified biologist, in consultation with CDFW and USFWS.
- Protective buffers (no-disturbance area around the nest) shall be established at a distance determined by the biologist based on the nesting species, its sensitivity to disturbance, and type of and duration of disturbance expected. Protective buffers shall remain in place until the young have fledged.
- Construction activities outside buffers may proceed while active nests are being monitored, at the discretion of the qualified biologist. If active nests are found to be at risk due to construction activities, construction activities shall be delayed until the qualified biologist determines that the young have fledged.

BR-7. <u>Wildlife Movement:</u> To allow for the continued movement of wildlife through the established wildlife corridors at the project site, without entrapment or entanglement, the following fencing design recommendations shall be followed:

- If fencing is installed along the northern or eastern property boundaries of the project site, it shall be a smooth wire or rail no more than 40" high and the lowest rail/wire 18" above the ground. If using a wire fence, the top two wires shall be at least 12" apart (Paige, 2008).
- It is recommended that the 6-foot-tall security fencing proposed along the western property boundary of the Royal Gold facility be designed without barbwire or razor wire. However, if it is determined that barbwire or razor wire are essential to preventing trespassing at the facility, the fencing shall be designed according to the following specifications (see Figure 20 – Proposed Security Fencing Design):
    - From the ground to 48 inches (0 to 4 feet), install chain link fence with 6-foot-tall poles.
    - From 48 to 60 inches (4 to 5 feet), install flat wrap razor wire affixed to the chain-link fence and the 6-foot-tall poles, and attach flagging or reflective material to the flat wrap razor wire (see photo) throughout the length of the fence.
    -

- From 60 to 72 inches (5 to 6 feet), install two lines of smooth wire (12 inches apart) pulled taught and affixed to the 6-foot-tall poles.

Figure 20 – Photo example of flat wrap razor wire

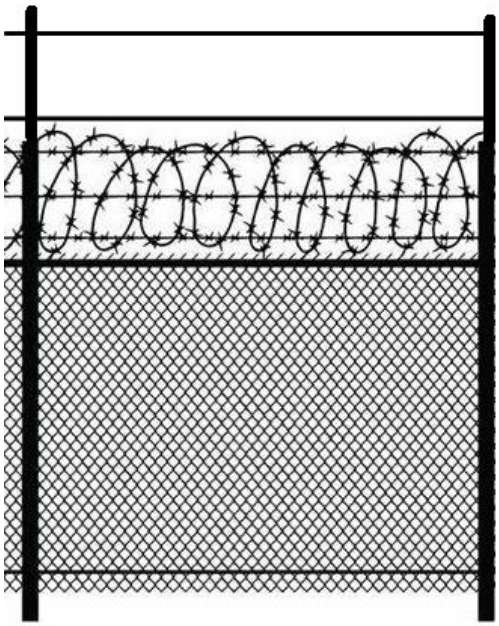


Figure 20 – Proposed Security Fencing Design

Findings: The project will have a **Less-than-significant Impact with Mitigation Incorporated** on Biological Resources.

3.2.5 Cultural Resources

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in 15064.5	☐	☐	☒	☐
b) Cause a substantial adverse change in the significance of an archeological resource pursuant to 15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Archaeological and other resources can be damaged through uncontrolled public disclosure. Archeological site locations and culturally-sensitive information is considered confidential and public access to such information is restricted by State and federal law, therefore this information has been redacted for use in the Mitigated Negative Declaration (MND). Professionally-qualified individuals, as determined by the California Office of Historic Preservation, may contact the lead agency in order to inquire about its availability.

Information regarding the location, character, or ownership of a historic resource is exempt from the Freedom of Information Act pursuant to 16 U.S.C. 470w-3 (National Historic Preservation Act) and 16 U.S.C. § 470hh (Archaeological Resources Protection Act) and California State Government Code, Section 6254.10.

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. It is located on sixteen separate parcels on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 – Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan).

To the north of the site is rural residential development and timberland. To the east of the site are rural residential and industrial uses. To the south of the site are commercial uses, industrial uses, rural residential uses, Glendale Drive, Highway 299, Hall Creek, and the Mad River. To the west of the site are rural residential uses, Glendale Drive, Highway 299, and the Mad River (see Figure 2 – Project Area). The Blue Lake Rancheria is located approximately 1.5 miles to the southeast of the project site adjacent to the City of Blue Lake.

The project site is within the traditional territory of the Patawat division of the Wiyot Tribe. This group controlled the lands from Little River to south of the Mad River, while two other divisions of the Tribe inhabited areas farther south and east (WRA, 2014).

In 2014, an Archaeological Survey Report was prepared that covered the facility footprint at that time, which was approximately 14 acres (WRA, 2014). The project area setting was found to be relatively disturbed with much of the ground surface disrupted and displaced. The historic uses of the property included a mill operation for over 50 years with terraced log decks, ponds, roadways, and buildings. Much of the surface was covered with paving and compacted gravel. During the investigation, no cultural resources were identified at the project site. The 2014 Report noted the presence of the historical route of the Arcata and Mad River Railroad, which once bisected the property. However, the railroad grade feature was destroyed and paved over and no evidence, other than a low dip in the terrain, was visible. This linear site, noted as CA-HUM-927H, is the area's first, and was one of California's longest lasting railroads. The grade is designated as California Historical Landmark #842; however, the Report determined that the reach through the Royal Gold facility does not contribute to the conveyance of historical significance. A set of four steel framed buildings, associated with former historical lumber mill operations, were noted within the survey area; however, these buildings lacked requisite integrity of design and association to be considered as historical resources eligible to the California Register of Historical Resources (CRHR) or National Register of Historic Places (NRHP) (WRA, 2014).

In 2021, an Addendum to the 2014 Archaeological Survey Report was prepared (WRA, 2021). The 2021 field investigation included approximately 30 acres, which coupled with the 2014 survey, brought the total survey coverage for the Royal Gold project site to 44 acres. The previous records search conducted in 2014 was utilized and combined with a current updated record search for the entire project area. The conclusions and recommendations in the Report stated the following (WRA, 2021):

> "*This report concludes that the proposed project activities will not cause significant impacts to historical resources because no cultural resources that would qualify under CEQA (15064.5(a)) are present. Due to the substantial ground disturbances that have taken place over the property, it would be unlikely that intact buried archaeological deposits exist. However, as per tribal coordination and standard archaeological practice, an inadvertent discovery protocol was provided in the instance cultural resources are uncovered during project activities*."

For the 2021 Addendum, WRA re-contacted tribal representatives from the Blue Lake Rancheria, Wiyot Tribe, and Bear River Band of the Rohnerville Rancheria on March 20, 2021. Janet Eidsness, Tribal Historic Preservation Officer (THPO) of the Blue Lake Rancheria, responded via email on March 22, 2021 noting the high level of disturbance at the property and asking that an inadvertent archaeological discovery protocol be a final recommendation for the project moving forward. Wiyot Tribal Chairman, Ted Hernandez responded on March 23, 2021 indicating he concurred with Ms. Eidsness. No other responses were received (WRA, 2021).

As required by AB 52, Humboldt County sent requests for formal consultation on April 1, 2021 to the THPOs for the Wiyot Tribe, Blue Lake Rancheria, and the Bear River Band of the Rohnerville Rancheria. The Blue Lake Rancheria and the Wiyot Tribe THPOs responded and

recommended that an inadvertent archaeological discovery protocol be made a project condition (Eidsness, 2021; Hernandez, 2021).

Analysis:

a) *Cause a substantial adverse change in the significance of a historical resource as defined in 15064.5?*
Less-than-significant Impact.

A 2014 Archaeological Survey Report (WRA, 2014) and a 2021 Addendum (WRA, 2021) concluded that the proposed project activities will not cause significant impacts to historical resources, because no cultural resources that would qualify under CEQA (15064.5(a)) are present. The 2014 Report noted the presence of the historical route of the Arcata and Mad River Railroad, which once bisected the property. However, the railroad grade feature was destroyed and paved over and no evidence, other than a low dip in the terrain, was visible. This linear site, noted as CA-HUM-927H, is the area's first, and was one of California's longest lasting railroads. The grade is designated as California Historical Landmark #842; however, the Report determined that the reach through the Royal Gold facility does not contribute to the conveyance of historical significance. A set of four steel framed buildings, associated with former historical lumber mill operations, were noted within the survey area; however, these buildings lacked requisite integrity of design and association to be considered as historical resources eligible to the CRHR or NRHP (WRA, 2014).

Based on the conclusions of the 2014 and 2021 Archaeological Survey Reports, the proposed project would not cause a substantial adverse change in the significance of a historical resource as defined in 15064.5. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

b) *Cause a substantial adverse change in the significance of an archeological resource pursuant to 15064.5?*
Less-than-significant with Mitigation Incorporated.

A 2014 Archaeological Survey Report (WRA, 2014) and a 2021 Addendum (WRA, 2021) concluded that the proposed project activities will not cause significant impacts to archaeological resources, because no cultural resources that would qualify under CEQA (15064.5(a)) are present. Due to the substantial ground disturbances that have taken place over the project site, it would be unlikely that intact buried archaeological deposits exist. However, as per Tribal coordination and standard archaeological practice, an inadvertent discovery protocol was provided in the instance cultural resources, including archaeological resources, are uncovered during project activities (WRA, 2021). The requirement to implement the recommended inadvertent discovery protocol has been included as Mitigation Measure CR-1 for the proposed project.

As required by AB 52, Humboldt County sent requests for formal consultation on April 1, 2021 to the THPOs for the Wiyot Tribe, Blue Lake Rancheria, and the Bear River Band of the Rohnerville Rancheria. The Blue Lake Rancheria and the Wiyot Tribe THPOs responded

and recommended that an inadvertent archaeological discovery protocol be made a project condition (Eidsness, 2021; Hernandez, 2021).

Therefore, if any cultural resources, including archaeological resources, are found during the construction of the proposed project, potential impacts will be mitigated through implementation of Mitigation Measure CR-1. Adherence to the inadvertent discovery protocols required by Mitigation Measure CR-1 would ensure the proposed project would not cause a substantial adverse change in the significance of an archaeological resource as defined in CEQA §15064.5. Therefore, the proposed project would result in a less than significant with mitigation incorporated on this category of environmental effect.

c) *Disturb any human remains, including those interred outside of formal cemeteries?*
Less-than-significant with Mitigation Incorporated.

The project site has been used for industrial purposes since the 1950s and there are no known burial sites on or immediately adjacent to the project site. However, there is a possibility that human remains and historic burial sites could exist in the area and may be uncovered during project development. To prevent potential impacts to unknown human remains at the project site, an inadvertent discovery protocol is included as Mitigation Measure CR-2. With the proposed mitigation measure, the project will not disturb any human remains, including those interred outside of formal cemeteries. Therefore, the proposed project would result in a less-than-significant impact with mitigation incorporated on this category of environmental effect.

Mitigation Measures:

CR-1. Inadvertent Discovery: If cultural resources are encountered during construction activities, all onsite work shall cease in the immediate area and within a 50-foot buffer of the discovery location. A qualified archaeologist will be retained to evaluate and assess the significance of the discovery, and develop and implement an avoidance or mitigation plan, as appropriate. For discoveries known or likely to be associated with Native American heritage (prehistoric sites and select historic period sites), the Tribal Historic Preservation Officers (THPOs) for the Blue Lake Rancheria, Wiyot Tribe and the Bear River Band of the Rohnerville Rancheria should be contacted immediately to evaluate the discovery and, in consultation with the project proponent, the County, and consulting archaeologist, develop a treatment plan in any instance where significant impacts cannot be avoided. Prehistoric materials which could be encountered include obsidian and chert debitage or formal tools, grinding implements, (for example, pestles, handstones, bowl mortars, slabs), locally darkened midden, deposits of shell, faunal remains, and human burials. Historic archaeological discoveries may include nineteenth century building foundations, structural remains, or concentrations of artifacts made of glass, ceramics, metal or other materials found in buried pits, wells or privies.

CR-2. Human Remains: If previously unidentified evidence of human burial or human remains are discovered during project construction, work will stop at the discovery location, within 20 meters (66 feet), and any nearby area reasonably suspected to overlie human remains (Public Resources Code, Section 7050.5), the Humboldt County Coroner must be informed and consulted, per State law. If the coroner determines the remains to be Native American, he or she

shall contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descendent. The most likely descendent will be given an opportunity to make recommendations for means of treatment of the human remains and any associated grave goods. when the commission is unable to identify a descendant or the descendants identified fail to make a recommendation, or the landowner or his or her authorized representative rejects the recommendation of the descendants and the mediation provided for in subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance. Work in the area shall not continue until the human remains are dealt with according to the recommendations of the County Coroner, Native American Heritage Commission and/or the most likely descendent have been implemented.

Findings: The project will have a **Less-than-significant Impact with Mitigation Incorporated** on Cultural Resources.

3.2.6 Energy

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☒	☐	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

Environmental Setting:

In Humboldt County, energy is primarily used as a transportation fuel and as electrical and heat energy in homes, businesses, industries, and agriculture. The majority of energy used in Humboldt County is imported, with the exception of biomass energy. Although the majority of electricity is generated in the county, a large portion of it is generated using natural gas. The county imports about 90% of its natural gas; the rest is obtained locally from fields in the Eel River valley (Schatz Energy Research Center, 2005). Essentially all of the county's transportation fuels are imported.

Humboldt County is remotely located at the end of the electrical and natural gas supply grids, and this limits both energy supply options and system reliability. Pacific Gas & Electric Company (PG&E) owns the natural gas and electricity transmission and distribution systems in Humboldt County. There is one major natural gas supply line that serves the county and four electrical transmission circuits (Schatz Energy Research Center, 2005).

Prior to May 2017, electricity provided to the project parcels was primarily sourced from the PG&E Humboldt Bay Generating Station (HBGS), which is located just south of the City of Eureka along Humboldt Bay. The HBGS began commercial operation in 2010 and normally runs on natural gas, with ultra-low sulfur diesel as its backup fuel (CEC, 2021b).

Beginning in May 2017, the electricity source for Humboldt County transitioned to the Redwood Coast Energy Authority (RCEA) Community Choice Energy (CCE) program. The CCE program allows city and county governments to pool (or aggregate) the electricity demands of their communities in order to increase local control over electric rates, purchase power with higher renewable content, reduce greenhouse gas emissions, and reinvest in local energy infrastructure. The electricity continues to be distributed and delivered over the existing power lines by PG&E (RCEA, 2021a). The CCE program procures approximately 47 percent of its power from renewable sources (RCEA, 2021b). In addition, customers can choose to opt up to a premium service called Repower+, which is 100 percent renewable energy at only $0.01 more per kilowatt hour (kWh) (RCEA, 2021a). RCEA is pursuing the following procurement goals which will further increase the percentage of power from renewable resources for all of its customers – 100% carbon-free electricity by 2025 (RCEA Board goal adopted in 2019) and 100% local carbon-free electricity by 2030 (Board goal adopted in 2016) (RCEA, 2021c).
The Royal Gold facility receives electricity from the RCEA CCE program and gas service from PG&E. Royal Gold has also enrolled in the RCEA Repower+ program, which provides 100

percent renewable energy to their facility. However, portions of the project site do not currently have electrical infrastructure. For this reason, several generators are used at the site to operate equipment in areas where electrical service is not available. Generators are currently used in Buildings A and B. In addition, generators are used as the energy source for bulk tote packaging on the eastern portion of the site and for power tools used for maintenance activity in various portions of the site. The generators currently used at the site include:

- 2,000-watt Generac gasoline generator – Model: IQ2000, 2.7 hp
- 3,000-watt Honda gasoline generator – Model: EU3000is, 4 hp
- 7,000-watt Honda gasoline generator – Model: EU7000is, 9.4 hp
- 20 kW Whisperwatt diesel generator – Model: DCA-25SSIU4F, 40.2 hp
- 20 kW PowerPro diesel generator – Model: SDG25S, 31.5 hp

Regulatory Setting:

Federal Laws – Energy Policy and Conservation Act, and CAFE Standards

The Energy Policy and Conservation Act of 1975 established nationwide fuel economy standards to conserve oil. Pursuant to this Act, the National Highway Traffic and Safety Administration, part of the U.S. Department of Transportation (DOT), is responsible for revising existing fuel economy standards and establishing new vehicle economy standards.

The Corporate Average Fuel Economy (CAFE) program was established to determine vehicle manufacturer compliance with the government's fuel economy standards. Compliance with CAFE standards is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the U.S. Environmental Protection Agency (EPA) calculates a CAFE value for each manufacturer based on the city and highway fuel economy test results and vehicle sales. The CAFE values are a weighted harmonic average of the EPA city and highway fuel economy test results. Based on information generated under the CAFE program, DOT is authorized to assess penalties for noncompliance. Under the Energy Independence and Security Act of 2007, the CAFE standards were revised for the first time in 30 years.

Federal Laws – Energy Policy Act (1992 and 2005) and Energy Independence and Security Act of 2007

The Energy Policy Act (EPAct) of 1992 was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally-fueled fleets in metropolitan areas. The EPAct of 2005 provides renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

The Energy Independence and Security Act of 2007 is designed to improve vehicle fuel economy and help reduce U.S. dependence on oil. The Energy Independence and Security Act of 2007 increased the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard

requiring fuel producers to use at least 36 billion gallons of biofuel in 2022, which represents a nearly five-fold increase over current levels; and reduces U.S. demand for oil by setting a national fuel economy standard of 35 miles per gallon by 2020—an increase in fuel economy standards of 40 percent. By addressing renewable fuels and CAFE standards, the Energy Independence and Security Act of 2007 will build on progress made by the EPAct of 2005 in setting out a comprehensive national energy strategy for the 21st century.

State Laws – Advanced Clean Cars Program

In January 2012, the California Air Resources Board (CARB) approved the Advanced Clean Cars program which combines the control of greenhouse gas (GHG) emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles, into a single package of standards for vehicle model years 2017 through 2025. The new rules strengthen the GHG standard for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's zero-emission vehicle regulation requires battery, fuel cell, and/or plug-in hybrid electric vehicles (EVs) to account for up to 15 percent of California's new vehicle sales by 2025. The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles planned by vehicle manufacturers by 2015 by requiring increased numbers of hydrogen fueling stations throughout the State. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. By 2025, when the rules will be fully implemented, the Statewide fleet of new cars and light trucks will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions than the Statewide fleet in 2016 (CARB, 2016).

State Law – Senate Bill 100: 100 Percent Clean Energy Act of 2018

Governor Jerry Brown signed into law Senate Bill (SB) 100 in September 2018, which requires utilities to procure 60 percent of their electricity from renewables by 2030, and sets as a state policy that state agencies and end-use retail customers receive 100 percent of energy from renewable and zero-carbon resources by 2045. SB 100 also requires the California Public Utilities Commission (CPUC), California Energy Commission (CEC), and CARB to use programs under existing laws to achieve 100 percent clean electricity and issue a joint policy report on SB 100 by 2021 and every four years thereafter. The SB 100 Joint Agency Report completed in March 2021 includes an initial assessment of the additional energy resources and the resource building rates needed to achieve 100 percent clean electricity, along with the associated costs. It uses a computer model to analyze these factors under various conditions and technologies. The initial modeling analysis suggests SB 100 is technically achievable through multiple pathways including (CEC, 2021c):

- Construction of clean electricity generation and storage facilities must be sustained at record-setting rates.
- Diversity in energy resources and technologies lowers overall costs.
- Retaining some natural gas power capacity may minimize costs while ensuring uninterrupted power supply during the transition to 100 percent clean energy.
- Increased energy storage and advancements in zero-carbon technologies can reduce natural gas capacity needs.

State Laws – Title 24, Building Energy Efficiency Standards

Title 24, which was promulgated by the CEC in 1977 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption, provides energy efficiency standards for residential and nonresidential buildings. These standards conserve electricity and natural gas and prevent the state from having to build more power plants. The success of these standards and other energy efficient efforts is a significant factor in California's per capita electricity use remaining flat over the last several decades while the rest of the country's use continues to rise. The energy efficient standards have saved Californian's billions in reduced electricity bills since 1977. California's Building Energy Efficient Standards are updated on an approximately three-year cycle. The most recent update was in 2019 which took effect on January 1, 2020. The 2019 Building Energy Efficiency Standards focus on four key areas: smart residential photovoltaic systems, updated thermal envelope standards (preventing heat transfer from the interior to exterior and vice versa), residential and nonresidential ventilation requirements, and nonresidential lighting requirements (CEC, 2021a).

Analysis:

a) *Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?* **Less-than-significant Impact.**

Energy consumption associated with the proposed project will occur during both the construction and operational activities.

Construction

During construction of the proposed project, energy would be consumed in the form of petroleum-based fuels used to power off-road construction vehicles and equipment, construction worker and delivery truck travel to and from the project site, and to operate generators to provide temporary power for electronic equipment. Construction activities will include activities such as site preparation, grading, trenching, building construction, paving, architectural coating, installation of stormwater improvements, landscaping, and construction of a wetland mitigation area.

The manufacture of construction materials used by the proposed project would also involve energy use. Due to the large number of materials and manufacturers involved in the production of construction materials (including manufacturers in other states and countries), upstream energy use cannot be reasonably estimated. However, it is reasonable to assume that manufacturers of building materials such as concrete, steel, etc., would employ all reasonable energy conservation practices in the interest of minimizing the cost of doing business. Furthermore, the applicant has no control over or the ability to influence energy resource use by the manufacturers of construction materials. Therefore, this analysis does not evaluate upstream energy use.

There are no unusual project characteristics that would require the use of construction equipment or practices that would be less energy efficient than at comparable construction sites in the region or State. Construction activity would be temporary and fuel consumption

would cease once construction ends. Further, various construction equipment would be supplied by onsite generators, and would not require permanent connections to or otherwise burden local utilities. Due to the temporary nature of construction activities, the fuel and energy needed during project construction activities would not be considered a wasteful or inefficient use of energy.

Therefore, it is expected that construction energy consumption associated with the proposed project would be comparable to other similar construction projects, and would therefore not be inefficient, wasteful, or unnecessary.

Operation

During operation of the proposed project, energy would be directly consumed for stationary and mobile equipment, power tools, lighting, space heating, appliances, and electric-powered facilities. Indirect energy consumption would be associated with the generation of electricity at power-generating facilities. Transportation-related energy consumption includes the use of fuels to power vehicles/trucks transporting materials and employees to and from the project site. Fuels consumed during operation of the project would include gasoline, diesel, and liquified petroleum gas.

As noted in the Setting, the Royal Gold facility receives electricity from the RCEA Repower+ program, which provides 100 percent renewable energy to their facility. However, portions of the project site do not currently have electrical infrastructure. For this reason, several generators are used at the site to operate equipment in areas where electrical service is not available. Generators are currently used in Buildings A and B. In addition, generators are used as the energy source for bulk tote packaging on the eastern portion of the site and for power tools used for maintenance activity in various portions of the site.

As stated in Section 2.3 – Project Description, installation of electric utility infrastructure is proposed to serve the new buildings at the site that were constructed after the Conditional Use Permit approval in August 2016. These buildings are labeled as Buildings A and B on Figure 6 – Site Plan. These existing buildings are used for coconut fiber processing (Building A) and peat processing (Building B). Once electricity is provided, these buildings will continue to be used for coconut fiber and peat processing, and equipment currently operated using generators will be connected to the electrical service. Electrical service is also proposed to be extended to proposed Buildings C, D, and E (Figure 6 – Site Plan), which are to be used for the storage, processing, and packaging of various raw and finished materials. The generators currently in use at the site will primarily be required for emergency power when electrical infrastructure is installed in the remaining portions of the site. As such, all of the existing and proposed buildings will be connected to the electrical grid and provided 100 percent renewable energy from the RCEA Repower+ program.

In addition to offering the Repower+ program, RCEA is pursuing the following procurement goals which will further increase the percentage of power from renewable resources for all of its customers: 1) 100% carbon-free electricity by 2025 (RCEA Board goal adopted in 2019); and 2) 100% local carbon-free electricity by 2030 (Board goal adopted in 2016; RCEA, 2021c). The procurement goals set by RCEA would allow Humboldt County to achieve a 100 percent renewable power mix in advance of State mandates in SB 100 (60 percent renewables by 2030 and 100 percent renewables by 2045). To ensure that Royal Gold continues its participation in the RCEA Repower+ program until all RCEA customers are

served with 100 percent renewable energy, Mitigation Measure EN-1 has been required for the proposed project. Mitigation Measure will ensure that Royal Gold continues to power its operations with all renewable energy.

Operational energy use will also occur in the form of transportation-related energy consumption including the use of fuels to power vehicles/trucks transporting materials and employees to and from the project site. Energy consumption from transportation is not anticipated to be wasteful or inefficient because of federal regulations such as the CAFE standards, which require vehicles to obtain higher fuel efficiency. Additionally, cleaner vehicles that rely on alternative fuels are increasing throughout Humboldt County and California, and through the State's Advanced Clean Car Program, more zero emission and electric vehicles are anticipated to be in use going forward.

As required by State regulations, the design of the structures proposed by the project would be in accordance with the most recently adopted edition of California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24, Part 6, of the California Code of Regulations) which will reduce energy use associated with the long-term operation of the project. It has generally been the presumption throughout the State of California that compliance with Title 24 ensures that projects will not result in the inefficient, wasteful, and unnecessary consumption of energy.

Therefore, the project as proposed, mitigated, and in compliance with existing laws and regulations, would not result in the inefficient, wasteful, or unnecessary use of energy either during construction or operation. Therefore, impacts are considered less than significant with mitigation incorporated on this category of environmental effect.

b) *Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?* **Less-than-significant Impact.**

As described under subsection a) above, the proposed project would not result in the inefficient or wasteful use of energy because of compliance with existing laws and regulations (for example, Title 24 Building Energy Efficiency Standards, CAFE standards, etc.) and participation in the RCEA Repower+ program, which provides 100 percent renewable energy.

In adherence to building efficiency standards, vehicle fuel efficiency standards, and with the project being served by 100 percent renewable energy, the proposed project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Therefore, the proposed project would result in a less-than-significant impact on this resource category.

Mitigation Measures:

EN-1. RCEA Repower+ Program: To minimize potential impacts from operational energy use, Royal Gold shall maintain its participation in the Redwood Coast Energy Authority (RCEA) Repower+ program, or secure power through any similar entity offering electricity generated from 100 percent renewable energy sources. Royal Gold's participation in this program shall occur until such time as RCEA is able to provide 100 percent renewable energy to all of its

customers. To ensure compliance with this mitigation measure, the Humboldt County Planning & Building Department reserves the right to request that the applicant supply copies of their electric utility billing records upon request.

Findings: The project would have a **Less-than-significant Impact with Mitigation Incorporated** on energy.

3.2.7 Geology and Soils

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii. Strong seismic ground shaking?	☐	☐	☒	☐
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv. Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soils, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐

Environmental Setting:

The project site is located in the unincorporated community of Glendale, approximately 800 feet north of the Mad River on the northern side of Highway 299 and Glendale Drive, on an existing industrial site that has been used for industrial purposes since the 1950s. The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The Mad River watershed is underlain by the Franciscan Complex of upper Jurassic through Cretaceous age assemblage of rock (Strand, 1962). The compilation of regional geologic mapping by McLaughlin et al. (2000) subdivides the Franciscan Complex into the Eastern, Central, and Coastal belts (Stillwater, 2010). The three belts are progressively younger in age from east to west. The Eastern and Central belts of the Franciscan Complex comprise a majority of the Mad River watershed (Strand, 1962). The Eastern belt of the Franciscan Complex occurs in the eastern part of the Mad River basin and consists predominantly of moderately metamorphosed greywacke sandstone. The Eastern belt in the Mad River basin also includes the

South Fork Mountain Schist, comprised of schistose metasedimentary and metavolcanic rocks which have been highly sheared, folded, and metamorphosed. The Central belt of the Franciscan Complex occurs in the western part of the Mad River basin. The Central belt consists predominantly of a mélange matrix of sheared argillite surrounding blocks of more coherent broken and folded schist, greywacke sandstone, and shale (McLaughlin et al., 2000). The coherent blocks may also include chert, greenstone, limestone, and metabasalt.

The project area is situated on a Late Pleistocene/Holocene fluvia1 terrace of the lower Mad River just as it leaves the Blue Lake fan and cuts through the north end of Fickle Hill on its way to the Arcata Bottom, approximately six miles from the Pacific Ocean. These and other terraces in nearby coastal river valleys have formed by fluvial response to sea level change, regional uplift, and active faulting. This is an active and relatively young geological setting. Rapid tectonic uplift in this region, coupled with a high annual rainfall, produces some of the highest erosion rates in the nation (Alt and Hyndman, 2000). Sediment load deposited in the local streams and rivers is therefore very high and has the potential to develop significant terrace deposits (WRA, 2014).

The Royal Gold facility is relatively flat and slopes generally to the south. Elevations at the project site range from approximately 90 feet above sea level in the south to approximately 125 feet in the north. Due to the site's long history of industrial use and development, substantial ground disturbances and grading have occurred throughout the project site. When Royal Gold moved to the site in 2009, it contained remnants of the former industrial uses, including asphalt and concrete pavement, buildings, compacted gravel surfaces, constructed stormwater management features, fencing, and utility infrastructure. The majority of the improvements on the site in 2009 were in the southern portion of the site. The northern portion of the site contained compacted gravel surfaces and graded and compacted soils that were historically used for log storage. No unique paleontological resources or unique geologic features have been discovered at the project site during past development activities.

The California Geological Survey (CGS, 2018) has the responsibility for mapping active earthquake faults in California, through legislation referred to as the Alquist-Priolo Earthquake Fault Zoning Act. According to the Central Humboldt Seismic Safety Map included in the County's 2017 General Plan, the project parcels are not located within an Alquist-Priolo Zone (Humboldt County, 2017b). The project parcels lie within the broad Mad River fault zone, which consists of a series of northwest-trending, northeast-dipping thrust faults that extend from Arcata to Trinidad. Within the Mad River fault zone, the fault nearest to the site is the McKinleyville Fault, located approximately 1 mile to the south of the project and also approximately 1.7 miles to the northwest (CDC, 2021b). However, the greatest seismic danger in the project area probably stems from the Cascadia Subduction Zone, which is capable of generating major earthquakes with a magnitude of 9.0 that would affect the project site.

According to the Humboldt County Web GIS system, other geologic conditions on the project site include the following (Humboldt County, 2021a):

- The southern portion of the site is mapped as an area with potential liquidation hazard.

- Most of the project site is mapped as having a stability rating of "Relatively Stable," with the exception of a small area in the northeastern corner of APN 516-111-062, which is rated as "High Instability."
- No historical landslides are mapped within or directly adjacent to the project site.

The Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS) soil mapping shows that soils on approximately 55% of the site are Timmons and Lepoil soils, 0 to 2 percent slopes (map unit symbol 185), which are classified as "prime farmland if irrigated." Soils on approximately 44% of the site are Lepoil-Candymountain complex, 2 to 15 percent slopes (map unit symbol 257), which are classified as "not prime farmland." Soils on approximately 1% of the site are Lepoil-Espa-Candymountain complex, 15 to 50 percent slopes (map unit symbol 258), which are classified as "not prime farmland" (NRCS, 2021).

Regulatory Setting:

Humboldt County General Plan – Safety Element

The Safety Element (Chapter 14) of the Humboldt County General Plan (Humboldt County, 2017a) contains standards and policies relevant to geologic hazards, which include the following:

- Standard S-S1 – Geologic Report Requirements: This standard requires the submittal of site-specific Geologic Reports that address geologic hazards and geologic conditions. The reports must be prepared in compliance with County Land Use and Development regulations for Geologic Hazards (Humboldt County Code, Title III, Division 3, Chapter 6, Section 336-5). These regulations require proposed development (that is the subject of the Geologic Report) to be sited, designed, and constructed in accordance with the recommendations of the report in order to minimize risk to life and property on the project site and for any other affected properties.
- Policy S-P7 – Structural Hazards: This policy states that the County shall protect life and property by applying and enforcing state-adopted building codes and Alquist-Priolo requirements to new construction.
- Policy S-P11 – Site Suitability: This policy states that new development may be approved only if it can be demonstrated that the proposed development will neither create nor significantly contribute to, or be impacted by, geologic instability or geologic hazards.

Analysis:

a.i) *Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.*
Less-than-significant Impact.

Seismically-induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults or even along different strands of the same fault. Surface

rupture can damage or collapse buildings, cause severe damage to roads and pavement structures, and cause failure of overhead, as well as underground utilities.

As noted in the Setting, according to the Central Humboldt Seismic Safety Map included in the County's 2017 General Plan, the project parcels are not located within an Alquist-Priolo Zone (Humboldt County, 2017b). The project parcels lie within the broad Mad River fault zone, which consists of a series of northwest-trending, northeast-dipping thrust faults that extend from Arcata to Trinidad. Within the Mad River fault zone, the fault nearest to the site is the McKinleyville Fault, located approximately 1 mile to the south of the project and also approximately 1.7 miles to the northwest (CDC, 2021b). Since the project parcels are not traversed by a known active fault and are not within 200 feet of an active fault trace, surface fault rupture is not considered to be a significant hazard for the development proposed on the project site.

The Safety Element (Chapter 14) of the Humboldt County General Plan contains standards and policies relevant to geologic hazards, which include the requirement for the submittal of site-specific Geologic Reports that address geologic hazards and geologic conditions (Humboldt County, 2017a). The reports must be prepared in compliance with County Land Use and Development regulations for Geologic Hazards (Humboldt County Code, Title III, Division 3, Chapter 6, Section 336-5). These regulations require proposed development (that is the subject of the Geologic Report) to be sited, designed, and constructed in accordance with the recommendations of the report in order to minimize risk to life and property on the project site and for any other affected properties. Chapter 3.8 – Geology and Soils of the Humboldt County General Plan Revised Draft Environmental Impact Report (EIR), states that compliance with this standard lessens potential environmental effects relating to geologic hazards including surface fault rupture (Humboldt County, 2017c).

Therefore, in compliance with existing laws and regulations, the proposed project will not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

ii) *Strong seismic ground shaking?*
Less-than-significant Impact.

The project area is located within the northern Coast Ranges Geologic Province, which is a seismically-active region in which large earthquakes may be expected to occur during the anticipated lifespan of any development on the project site. Great, very large earthquakes are possible. Strong seismic shaking is a regional hazard and is not specific to the site. As discussed in the Setting, the project parcels are not located within an Alquist-Priolo Zone (Humboldt County, 2017b). The project parcels lie within the broad Mad River fault zone, which consists of a series of northwest-trending, northeast-dipping thrust faults that extend from Arcata to Trinidad. Within the Mad River fault zone, the fault nearest to the site is the McKinleyville Fault, located approximately 1 mile to the south of the project and also approximately 1.7 miles to the northwest (CDC, 2021b). However, the greatest seismic danger in the project area probably stems from the Cascadia Subduction Zone, which is

capable of generating major earthquakes with a magnitude of 9.0 that would affect this site. Humboldt County in general is at risk for strong ground shaking; this project will not increase that risk.

The Safety Element (Chapter 14) of the Humboldt County General Plan (Humboldt County, 2017a) contains standards and policies relevant to geologic hazards, which include the requirement for the submittal of site-specific Geologic Reports that address geologic hazards and geologic conditions. The reports must be prepared in compliance with County Land Use and Development regulations for Geologic Hazards (Humboldt County Code, Title III, Division 3, Chapter 6, Section 336-5). These regulations require proposed development (that is the subject of the Geologic Report) to be sited, designed, and constructed in accordance with the recommendations of the report in order to minimize risk to life and property on the project site and for any other affected properties. Chapter 3.8 – Geology and Soils of the Humboldt County General Plan Revised Draft EIR, states that this standard lessens potential environmental effects relating to geologic hazards including strong seismic ground shaking (Humboldt County, 2017c).

The State of California provides minimum standards for building design through the California Building Code (CBC). Specific minimum seismic safety and structural design requirements are set forth in CBC Chapter 16. The CBC identifies seismic factors that must be considered in structural design. Development on the project site would be required to comply with State and local regulations related to seismic hazards (e.g., building codes and other applicable regulations). Adherence to existing State and County seismic building standards will avoid or significantly reduce potential impacts to people or structures from strong seismic ground shaking.

Therefore, in compliance with existing laws and regulations, the proposed project will not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

iii) *Seismic-related ground failure, including liquefaction?*
Less-than-significant Impact.

Liquefaction is a phenomenon whereby unconsolidated and/or near-saturated soils lose cohesion and are converted to a fluid state as a result of severe vibratory motion. The relatively rapid loss of soil shear strength during strong earthquake shaking results in temporary, fluid-like behavior of the soil. Soil liquefaction causes ground failure that can damage roads, pipelines, underground cables, and buildings with shallow foundations.

The Humboldt County Web GIS system identifies the southern portion of the site as being an area with potential liquefaction hazard (Humboldt County, 2021a). The liquefaction potential would presumably increase with the size and duration of the triggering earthquake. As such, it is expected that liquefaction potential is highest for great earthquakes associated with the Cascadia Subduction Zone. Liquefaction-related damage to structures can be mitigated through a variety of engineered solutions. These solutions focus on improvement of the structure's foundation, or on preparation of site soils to reduce the liquefaction potential.

The Safety Element (Chapter 14) of the Humboldt County General Plan (Humboldt County, 2017a) contains standards and policies relevant to geologic hazards, which include the requirement for the submittal of site-specific Geologic Reports that address geologic hazards and geologic conditions. The reports must be prepared in compliance with County Land Use and Development regulations for Geologic Hazards (Humboldt County Code, Title III, Division 3, Chapter 6, Section 336-5). These regulations require proposed development (that is the subject of the Geologic Report) to be sited, designed, and constructed in accordance with the recommendations of the report in order to minimize risk to life and property on the project site and for any other affected properties. Chapter 3.8 – Geology and Soils of the Humboldt County General Plan Revised Draft EIR, states that this standard lessens potential environmental effects relating to geologic hazards including seismic-related ground failure such as liquefaction (Humboldt County, 2017c).

The State of California provides minimum standards for building design through the California Building Code (CBC). Specific minimum seismic safety and structural design requirements are set forth in CBC Chapter 16. The CBC identifies seismic factors that must be considered in structural design. Chapter 18 of the CBC regulates the excavation of foundations and retaining walls, while Chapter 18A regulates construction on unstable soils, such as expansive soils and areas subject to liquefaction. Appendix J of the CBC regulates grading activities, including drainage and erosion control. The CBC contains a provision that provides for a preliminary soil report to be prepared to identify "…the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects" (CBC Chapter 18 Section 1803.1.1.1). New development on the project site would be required to comply with State and local regulations related to seismic hazards (for example, building codes and other applicable regulations). Adherence to existing State and county seismic building standards will avoid or significantly reduce potential impacts to people or structures from seismic-related ground failure such as liquefaction.

Therefore, in compliance with existing laws and regulations, the proposed project will not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

iv) *Landslides?*
Less-than-significant Impact.

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, either triggered by static (such as, gravity) or dynamic (such as, earthquake) forces. Earthquake motions can induce significant horizontal and vertical dynamic stresses in slopes that can trigger failure. Earthquake-induced landslides can occur in areas with steep slopes that are susceptible to strong ground motion during an earthquake. The youthful and steep topography of the coast range is known for its potential for landslides.

As noted in the setting, the Royal Gold facility is relatively flat and slopes generally to the south. Elevations at the project site range from approximately 90 feet above sea level in the

south to approximately 125 feet in the north. According to the Humboldt County Web GIS system, most of the project site is mapped as having a stability rating of "*Relatively Stable*," with the exception of a small area in the northeastern corner of APN 516-111-062, which is rated as "*High Instability*." Additionally, the Humboldt County Web GIS system indicates that no historical landslides are mapped within or directly adjacent to the project site. All existing and proposed structures at the project site would be located within the area identified as "*Relatively Stable*."

Therefore, in compliance with existing laws and regulations, the proposed project will not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

b) *Result in substantial soil erosion or the loss of topsoil?*
Less-than-significant Impact.

The proposed project seeks after-the-fact authorization for expanded operations and existing improvements made to the site since Royal Gold began operating its potting soil manufacturing business there in March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of its growing business.

Construction
Construction of the improvements proposed by the project would include grading, excavation, trenching, and other ground-disturbing activities that have the potential to result in soil erosion. It is not anticipated that the proposed construction activities would result in the loss of topsoil since the undeveloped portions of the project site are primarily covered with imported fill and compacted gravel. The proposed construction activities would be subject to the requirements of the Humboldt County Grading, Excavation, Erosion, and Sedimentation Control Ordinance (Section 331-12), which sets forth rules and regulations to control excavation, grading and earthwork construction, including fills and embankments and erosion, and sedimentation controls. In addition to providing a plan that identifies the location of the work, applications for grading permits shall also include a site-specific erosion and sediment control plan. The ordinance contains a list of minimum requirements for erosion and sedimentation control. Grading activities are also required to conform to grading standards, including for cut slope, fill material, setbacks, terracing, and drainage. If applicable, some of the proposed improvements may require obtaining a State Water Resources Control Board (SWRCB) Construction General Permit, which requires the development of a Stormwater Pollution Prevention Plan (SWPPP; SWRCB, 2021c). In some cases, a SWPPP may be submitted to the County in lieu of the erosion and sediment control plan required by the grading ordinance. Adherence to existing County and State grading and erosion control regulations would prevent substantial soil erosion from the proposed construction activities.

Operation
Based on the existing and proposed development at the project site, operation of the proposed project is not expected to result in substantial soil erosion or the loss of topsoil. Currently, the

majority of the project site is covered with paving, compacted gravel surfaces, and buildings. The project proposes new improvements at the project site including additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of its growing business. After construction of the proposed improvements, the areas of the site that would have the potential for erosion will primarily be in the northern portion of the site (for example, wetland mitigation area). As indicated on Figure 6 – Site Plan, these areas would be separated from the industrial activity by berms.

Stormwater:
As discussed more thoroughly in Section 3.2.10 – Hydrology and Water Quality, the Royal Gold operation is subject to the authority of the SWRCB and requires coverage under the Industrial General Permit or IGP. Royal Gold complies with the IGP with a Stormwater Pollution Prevention Plan (SWPPP), which is periodically updated for current operational conditions. Royal Gold's approach to reducing pollutant concentrations in stormwater runoff leaving the site includes the following (SHN, 2021c):

- Personnel stormwater management training
- Site housekeeping and maintenance program
- Site cleanup of historical soil, metal, and trash (much of which was buried or overgrown)
- Installation of innovative best management practices (BMPs) to filter, slow, and reduce stormwater runoff
- Sampling and monitoring to evaluate the effectiveness of BMPs and identifying areas for continual stormwater quality improvement

The project has increased the impervious surface area at the project site by constructing several new structures (Building A, Building B, and addition to amendment storage building) and paving additional areas to improve site access and stormwater management, minimize fugitive dust, and address concerns about disturbing onsite soils. As additional impervious surfaces have been installed at the site, Royal Gold has constructed numerous stormwater improvements to manage the increase in runoff and comply with the requirements of the SWRCB IGP. Several of these improvements included upgrades to the stormwater infrastructure at the site that was installed by others during past industrial use. As discussed elsewhere in this document, these improvements also include the conversion of the southern central wetland area at the site into stormwater detention basins. Existing stormwater management features at the project site are identified in the current SWPPP (SHN, 2021c) and include, but are not limited to, detention basins, bioswales, lined ditches, floating treatment islands, sediment traps, gravel bags, check dams, fiber media socks, drainage ditches, drainage inlets, culverts, and stormwater piping. See Figure 13 – SWPPP BMP Location Map, which shows the existing stormwater management features at the site and the ten locations of stormwater discharge from the site. The existing stormwater management improvements at the project site adequately manage stormwater runoff and minimize the potential for erosion on- or offsite.

The project proposes to construct several additional structures (Building C, Building D, Building E, Building F or addition to existing building, and fueling station) and pave

additional areas in the northern portion of the site (see Figure 6 – Site Plan). These improvements will further increase the impervious surface area at the site, which has the potential to increase the rate and amount of stormwater runoff and result in erosion and discharge of sediment to nearby drainage features. Royal Gold proposes to construct additional stormwater improvements at the site (for example, detention basins, bioswales, etc.) to manage the increased stormwater runoff from the additional impervious surfaces. These additional stormwater features will be incorporated into the facilities SWPPP and the effectiveness of these features will be monitored through the SWRCB IGP. The stormwater improvements will be designed to reduce the volume and rate of runoff, provide for greater infiltration, evaporation, and runoff quality treatment. As such, it is not anticipated that the proposed improvements to the Royal Gold facility will result in significant impacts from erosion.

Wetland Mitigation:
As part of construction of the wetland mitigation area, it is proposed to enlarge the opening in the constructed berm along the southern edge of the drainage in the northwestern portion of the site. There is currently an approximate 3-foot-wide opening in the constructed berm along the southern edge of the drainage, which allows water to temporarily spread out into the existing wetland areas and proposed wetland mitigation area during higher flows. The opening in the berm is proposed to be widened to approximately 5-8 feet to allow additional water to temporarily flow into the wetland mitigation area during higher flow events. This proposed design feature is intended to increase the likelihood of success of the proposed mitigation wetland. The enlarged opening would be designed with appropriate erosion control features (for example, rock slope protection, etc.) to prevent substantial erosion or siltation within the drainage, existing wetlands, and proposed wetland mitigation area. Because the proposed construction of the wetland mitigation area will impact federal, state, and local agency jurisdictional areas, the following permits will be required: 1) Clean Water Act Section 404 Permit from the U.S. Army Corps of Engineers (USACE); 2) Section 401 Water Quality Certification from the North Coast RWQCB; 3) Lake and Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW); and 4) Special Permit from the County of Humboldt. These permits will be conditioned to require erosion control design features to minimize the potential for erosion and siltation after construction of the proposed mitigation wetland.

Conclusion
The proposed project as designed and in compliance with the requirements of the SWRCB, USACE, North Coast RWQCB, CDFW, and Humboldt County, would not result in substantial soil erosion or the loss of topsoil during construction or operation. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

c) *Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?*
Less-than-significant Impact.

As noted in the setting, the Royal Gold facility is relatively flat and slopes generally to the south. Elevations at the project site range from approximately 90 feet above sea level in the south to approximately 125 feet in the north. According to the Humboldt County Web GIS system, most of the project site is mapped as having a stability rating of "*Relatively Stable*," with the exception of a small area in the northeastern corner of APN 516-111-062, which is rated as "*High Instability*." Additionally, the Humboldt County Web GIS system indicates that no historical landslides are mapped within or directly adjacent to the project site. All existing and proposed structures at the project site would be located within the area identified as "*Relatively Stable*."

The Safety Element (Chapter 14) of the Humboldt County General Plan (Humboldt County, 2017a) contains standards and policies relevant to geologic hazards, which include the requirement for the submittal of site-specific Geologic Reports that address geologic hazards and geologic conditions. The reports must be prepared in compliance with County Land Use and Development regulations for Geologic Hazards (Humboldt County Code, Title III, Division 3, Chapter 6, Section 336-5). These regulations require proposed development (that is the subject of the Geologic Report) to be sited, designed, and constructed in accordance with the recommendations of the report in order to minimize risk to life and property on the project site and for any other affected properties. Chapter 3.8 – Geology and Soils of the Humboldt County General Plan Revised Draft EIR, states that this standard lessens potential environmental effects relating to geologic hazards (Humboldt County, 2017c).

The State of California provides minimum standards for building design through the CBC. Specific minimum seismic safety and structural design requirements are set forth in CBC Chapter 16. The CBC identifies seismic factors that must be considered in structural design. Chapter 18 of the CBC regulates the excavation of foundations and retaining walls, while Chapter 18A regulates construction on unstable soils, such as expansive soils and areas subject to liquefaction. Appendix J of the CBC regulates grading activities, including drainage and erosion control. The CBC contains a provision that provides for a preliminary soil report to be prepared to identify "…the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects" (CBC Chapter 18 Section 1803.1.1.1). New development on the project site would be required to comply with State and local regulations related to seismic hazards (for example, building codes and other applicable regulations). Adherence to existing State and county seismic building standards will avoid or significantly reduce potential impacts from soil instability.

Therefore, in compliance with existing laws and regulations, the proposed project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

d) *Be located on expansive soils, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?*
Less-than-significant Impact.

Expansive soils are those that undergo a change in volume when exposed to fluctuations in moisture, causing shrinking when dry and swelling when moist. Such change in volume can

distort structural elements and damage structures. Typically, soils with high clay contents are most susceptible to these processes.

There are no documented expansive soils present at the project site. Soils on most of the project site have been disturbed by industrial development beginning in the 1950s. The original soils mapped in this area (Timmons and Lepoil soils, Lepoil-Candymountain complex, and Lepoil-Espa-Candymountain complex) contain a mix of fine sandy loams, loams, silt loams and a minor amount of clay loams. These soil types are all considered well-drained (NRCS, 2021), making it unlikely that these soils are expansive in nature. As discussed above in subsections a) and c), the project applicant will be required to prepare geologic and soils reports that will contain design recommendations for addressing unsuitable soil conditions (if present at the project site). Adherence to existing State and county standards will avoid or significantly reduce potential impacts from expansive soils.

Therefore, the proposed project will not be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

e) *Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?*
No Impact.

Wastewater collection is provided to the project site by Fieldbrook-Glendale Community Services District (FGCSD) who contracts with the City of Arcata for treatment and disposal. As such, the use of septic tanks or alternative wastewater disposal systems where sewers are not available is not relevant to the proposed project. Therefore, the proposed project would result in no impact on this category of environmental effect.

f) *Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*
Less-than-significant Impact.

Paleontological resources are classified as nonrenewable scientific resources, such as vertebrate, invertebrate, and plant fossils. Soils on most of the project site have been disturbed by the development and operation of industrial uses beginning in the 1950s. No paleontological resources or unique geologic features are known to exist on the project site. Due to the surface and subsurface condition of the site, the presence of unique paleontological resources or unique geologic features is unlikely. Therefore, the project is unlikely to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature and the impact is less than significant.

Mitigation Measures: No mitigation required.

Findings: The project would have a **Less-than-significant Impact** on Geology and Soils.

3.2.8 Greenhouse Gas Emissions

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions (GHG), either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG?	☐	☐	☒	☐

Environmental Setting:

Greenhouse gases (GHGs) are gases in the atmosphere that absorb and emit radiation. The greenhouse effect traps heat in the troposphere through a three-fold process, summarized as follows: short wave radiation emitted by the sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit this long-wave radiation into space and toward the Earth. This "trapping" of the long-wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect. Other than water vapor, the primary GHGs contributing to global climate change include the following gases:

- Carbon dioxide (CO2), primarily a byproduct of fuel combustion;
- Nitrous oxide (N2O), a byproduct of fuel combustion and associated with agricultural operations such as the fertilization of crops;
- Methane (CH4), commonly created by off-gassing from agricultural practices (for example, livestock), wastewater treatment, and landfill operations;
- Chlorofluorocarbons (CFCs), which were used as refrigerants, propellants, and cleaning solvents, although their production has been mostly prohibited by international treaty;
- Hydrofluorocarbons (HFCs), which are now widely used as a substitute for chlorofluorocarbons in refrigeration and cooling; and
- Perfluorocarbons (PFCs) and sulfur hexafluoride (SF6) emissions, which are commonly created by industries such as aluminum production and semiconductor manufacturing.

Global climate change is not confined to a particular project area and is generally accepted as the consequence of GHG emissions from global industrialization over the last 200 years. A typical project, even a very large one, does not generate enough GHG emissions on its own to influence global climate change significantly; hence, the issue of global climate change is, by definition, a cumulative environmental impact.

Electrical Service

Beginning in May 2017, electricity service for Humboldt County transitioned to the Redwood Coast Energy Authority (RCEA) Community Choice Energy (CCE) program. The CCE program allows city and county governments to pool (or aggregate) the electricity demands of their

communities in order to increase local control over electric rates, purchase power with higher renewable content, reduce greenhouse gas emissions, and reinvest in local energy infrastructure. The electricity continues to be distributed and delivered over the existing power lines by Pacific Gas & Electric (PG&E). The CCE program procures approximately 47 percent of its power from renewable sources (RCEA, 2021b). In addition, customers can choose to opt up to a premium service called Repower+, which is 100 percent renewable energy at only $0.01 more per kilowatt hour (kWh) (RCEA, 2021a). RCEA is pursuing the following procurement goals which will further increase the percentage of power from renewable resources for all its customers – 100% carbon-free electricity by 2025 (RCEA Board goal adopted in 2019) and 100% local carbon-free electricity by 2030 (Board goal adopted in 2016) (RCEA, 2021c).

The Royal Gold facility receives electricity from the RCEA CCE program. Royal Gold has also enrolled in the RCEA Repower+ program, which provides 100 percent renewable energy to their facility. However, portions of the project site do not currently have electrical infrastructure. For this reason, several generators are used at the site to operate equipment in areas where electrical service is not available. Generators are currently used in Buildings A and B. In addition, generators are used as the energy source for bulk tote packaging on the eastern portion of the site and for power tools used for maintenance activity in various portions of the site. The generators currently used at the site include:

- 2,000-watt Generac gasoline generator – Model: IQ2000, 2.7 hp
- 3,000-watt Honda gasoline generator – Model: EU3000is, 4 hp
- 7,000-watt Honda gasoline generator – Model: EU7000is, 9.4 hp
- 20 kW Whisperwatt diesel generator – Model: DCA-25SSIU4F, 40.2 hp
- 20 kW PowerPro diesel generator – Model: SDG25S, 31.5 hp

Regulatory Setting:

California - GHG Emissions Legislation and Regulations

California passed Assembly Bill 32 (Global Warming Solutions Act) in 2006, mandating a reduction in GHG emissions and Senate Bill 97 in 2007, evaluating and addressing GHG under CEQA. On April 13, 2009, the Governor's Office of Planning and Research (OPR) submitted to the Secretary for Natural Resources its proposed amendments to the State CEQA Guidelines for GHG emissions, as required by Senate Bill 97 (Chapter 185, 2007) and they became effective March 18, 2010. As a result of these revisions to the CEQA Guidelines, lead agencies are obligated to determine whether a project's GHG emissions significantly affect the environment and to impose feasible mitigation to eliminate or substantially lessen any such significant effects. A lead agency is not responsible for wholly eliminating all GHG emissions from a project; the CEQA standard is to mitigate to a level that is "less-than-significant" or, in the case of cumulative impacts, less than cumulatively considerable (SMAQMD, 2018).

The Global Warming Solutions Act (AB 32) also directed California Air Resources Board (CARB) to develop the Climate Change Scoping Plan (Scoping Plan), which outlines a set of actions to achieve the AB 32 goal of reducing GHG emissions to 1990 levels by 2020, and to maintain such reductions thereafter. CARB approved the Scoping Plan in 2008 and first updated

it in May 2014. The second update in November 2017 also address the actions necessary to achieve the further GHG emissions reduction goal of reducing GHG emissions to 40 percent below 1990 levels by 2030, as described in Senate Bill 32 (SB 32). In addition, the 2017 Scoping Plan looks forward to the reduction goal of reducing emissions 80 percent under 1990 levels by 2050, as described in Executive Order S-3-05 (EO-S-3-05) (CARB, 2017). According to CARB, in 2019, emissions from GHG emitting activities statewide were 418.2 million metric tons of carbon dioxide equivalent (MMTCO2e), 7.2 MMTCO2e lower than 2018 levels and almost 13 MMTCO2e below the 2020 GHG limit of 431 MMTCO2e (CARB, 2021b).

CEQA Guidelines – Significance Criteria

Section 15064.4 of the CEQA guidelines specifies how the significance of impacts from greenhouse gas (GHG) emissions is to be determined. The Lead Agency is to make a good faith effort to describe, calculate, or estimate the amount of GHG emissions that will result from a project. The Lead Agency is also to consider the following factors when accessing the impacts of the GHG emissions on the environment:

1. Extent to which the project may increase or reduce GHG emissions, relative to the existing environmental setting.
2. Whether the project emissions exceed a threshold of significance that the Lead Agency determines applies to the project.
3. Extent to which the project complies with regulations adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

The project site is located in the North Coast Air Basin (NCAB) and is under the jurisdiction of the North Coast Unified Air Quality Management District (NCUAQMD). Neither Humboldt County nor the NCUAQMD have adopted quantitative thresholds for determining the significance of GHG emissions from land use projects in environmental documents. In addition, as discussed below, Humboldt County does not have an adopted Climate Action Plan or GHG Reduction Plan. In 2011, the NCUAQMD adopted Rule 111 (Federal Permitting Requirements for Sources of Greenhouse Gases) to establish a threshold above which New Source Review and federal Title V permitting apply, and to establish federally-enforceable limits on the potential to emit GHGs for stationary sources. For reference, Sections D(1)(a) and D(1)(b) of Rule 111 have applicability thresholds of 75,000 metric tons of carbon dioxide equivalent per year (MTCO2e/yr) and 100,000 MTCO2e/yr (NCUAQMD, 2015). These are requirements applicable to stationary sources and are not recommended as a threshold of significance for use in CEQA documents. In the absence of quantitative thresholds, a Climate Action Plan, or a GHG Reduction Plan applicable to the proposed project, lead agencies often use the thresholds and guidance adopted by other air districts in the State.

In the NCAB, the closest air district to the proposed project that has adopted GHG significance thresholds is the Mendocino Air Quality Management District (MCAQMD, 2010). MCAQMD has adopted an operational emissions threshold of 1,100 metric tons of CO2e per year (MTCO2e/yr) (MCAQMD, 2010). This threshold is also recommended for use by the Bay Area Air Quality Management District (BAAQMD, 2017) and the Sacramento Metropolitan Air Quality Management District (SMAQMD, 2020). The SMAQMD also recommends use of this threshold for analyzing GHG emissions from construction activity. This threshold was developed to ensure at least 90 percent of new GHG emissions would be reviewed and assessed for

mitigation, thereby contributing to GHG emissions reduction goals of AB 32, SB 32, the Scoping Plan, and Executive Orders (SMAQMD, 2018). As such, this threshold has been adopted for use in the NCAB and is one of the most used thresholds in the State for analyzing the potential impacts of construction and operational GHG emissions. For the reasons noted above, the threshold of 1,100 MTCO2e/yr is used to evaluate the proposed project's construction and operational GHG emissions. If the threshold is exceeded, then the project would have a cumulatively considerable contribution to a significant cumulative environmental impact and would conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing GHG emissions.

Humboldt County Draft Climate Action Plan

In January 2012, as part of the General Plan Update, Humboldt County prepared a Draft Climate Action Plan (CAP) to reduce GHG emissions in the unincorporated County (Humboldt County, 2012). The Plan contains GHG reduction strategies designed to achieve the target of reducing GHG emissions to 1990 emissions levels by 2020. The 2012 Draft CAP also set an additional target to achieve no net increase of GHG emissions compared to building-as-usual emissions from the 1984 General Plan for new residential development within the County by the year 2025. To comply with SB 32, the County is in the process of preparing county-wide GHG emissions targets for the year 2030 (and possibly also 2040) as part of a Regional Climate Action Plan that will incorporate an updated 1990 GHG Inventory.

Analysis:

a) *Generate greenhouse gas emissions (GHG), either directly or indirectly, that may have a significant impact on the environment?*
Less-than-significant Impact.

The proposed project seeks after-the-fact authorization for expanded operations and existing improvements made to the site since Royal Gold began operating its potting soil manufacturing business there in March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of its growing business. The proposed project would generate both direct and indirect GHG emissions. Direct GHG emissions include emissions from construction activities, area sources, and mobile (vehicles and equipment) sources. Indirect GHG emissions include emissions from energy consumption, solid waste, and water demand.

Both construction and operational emissions for the proposed project were estimated using the California Emissions Estimator Model (CalEEMod), which is a statewide land use emissions computer model designed to provide a uniform platform for government agencies to quantify potential criteria pollutant emissions and greenhouse gas emissions associated with both construction and operation of a variety of land use projects (see Appendix 5.3; CAPCOA, 2020). The model applies inherent default values for various land uses, including trip generation rates based on the Institute of Transportation Engineers (ITE) Manual, vehicle mix, trip length, average speed, etc. However, where project-specific data is available, such data should be input into the model. Project-specific information from the Plan of Operations (see Appendix 5.1; Royal Gold, 2021), where available, was input into the model. Otherwise,

where project-specific information was not available, the model default values were used for estimating emissions from the project.

Table 7 presents the estimates of unmitigated annual GHG emissions from construction and operation of the proposed project as compared to the 1,100 MTCO2e/yr threshold of significance.

Table 7: Annual GHG Emissions (Unmitigated)

Project Phase	GHG Emissions (MTCO2e/yr)	Threshold of Significance (MTCO2e/yr)	Significant Impact?
Construction	581.6	1,100	No
Operation	667.5	1,100	No
1. Appendix 5.3; CAPCOA, 2020 2. MCAQMD, 2010; BAAQMD, 2017; SMAQMD, 2020			

Construction

Project construction activities would result in a temporary increase in GHG emissions during each phase of the project, including exhaust emissions from on-road haul trucks, worker commute vehicles, and off-road heavy-duty equipment. As indicated in Table 7, the construction GHG emissions from the proposed project are well below the threshold of significance of 1,100 MTCO2e/yr. Therefore, construction GHG emissions from the proposed project would not result in a significant impact on the environment.

It should be noted that for the purposes of calculating construction emissions, the model default construction schedule conservatively assumed that all the proposed improvements would be constructed over an 18-month period from May 2022 to November 2023. Although phasing of the improvements may occur, this assumption provides a worst-case scenario for construction emissions. As such, the annual GHG emissions that would occur from project construction activities would most likely be less than indicated in the modeling results since they would be spread out over a longer period.

Operation

During operation of the proposed project, both direct and indirect GHG emissions would be generated. Direct GHG emissions include emissions from area sources and mobile (vehicles and equipment) sources. Royal Gold uses both stationary and mobile equipment and vehicles during facility operations. Stationary equipment includes a horizontal grinder and two soil/mixing bagging lines. Royal Gold also has a portable trommel screener. Mobile equipment/vehicles include, but are not limited to, front-end loaders, dump trucks, forklifts, generators, mini-excavator, and hauling trucks. Indirect GHG emissions from the proposed project would include emissions from energy consumption, solid waste, and water demand. As indicated in Table 7, the operational GHG emissions from the proposed project are well below the threshold of significance of 1,100 MTCO2e/yr. Therefore, operational GHG emissions from the proposed project would not result in a significant impact on the environment.

It should be noted that due to the limitations of the CalEEMod model, the electricity provided to the project site was assumed to be the standard power mix that RCEA provides to all its

customers (~47 percent renewable sources). However, as noted in the Setting, Royal Gold has enrolled in the RCEA Repower+ program, which provides 100 percent renewable energy to their facility. As such, indirect GHG emissions from project electricity use would be less than indicated in the modeling results.

Additionally, manufacturing of soil at this site involves reuse and recycling of by-products (for example, sawdust), which reduces landfill disposal and helps produce a product which can serve as an alternative to chemical fertilizers, which generally involve more energy-intensive manufacturing processes. In particular, the manufacturing of nitrogen fertilizer generates greenhouse gases, including: carbon dioxide, methane, and nitrous oxide.

Conclusion

Therefore, construction and operation of the proposed project would not generate GHG, either directly or indirectly, that may have a significant impact on the environment. Therefore, impacts from the proposed project would be less than significant on this category of environmental effect.

b) *Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG?*
Less-than-significant Impact.

The proposed project seeks after-the-fact authorization for expanded operations and existing improvements made to the site since Royal Gold began operating its potting soil manufacturing business there in March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of its growing business. The proposed project would result in GHG emissions from construction and operation. A GHG impact would be significant if the project would conflict with an applicable plan, policy or regulation for the purpose of reducing GHG emissions. As noted in the setting, a CAP that is consistent with SB 32 has not yet been adopted by Humboldt County.

The proposed project is subject to a myriad of State and local regulations applicable to project design, construction, and operation that would reduce GHG emissions, increase energy efficiency, and provide compliance with the CARB Climate Change Scoping Plan (CARB, 2017). The State of California has the most comprehensive GHG regulatory requirements in the United States, with laws and regulations requiring reductions that affect project emissions. Legal mandates to reduce GHG emissions from vehicles, for example, reduce project-related vehicular emissions. Legal mandates to reduce per capita water consumption and impose waste management standards to reduce methane and other GHGs from solid wastes are all examples of mandates that reduce GHGs. It is noted that according to CARB, in 2019, emissions from GHG-emitting activities statewide were 418.2 million metric tons of carbon dioxide equivalent (MMTCO2e), 7.2 MMTCO2e lower than 2018 levels and almost 13 MMTCO2e below the 2020 GHG limit of 431 MMTCO2e (CARB, 2021b).

As discussed above under subsection a), GHG emissions from the proposed project's construction and operational activity are well below the threshold of significance of 1,100

MTCO2e/yr that is used by several air districts in the state to determine the significance of impacts from GHG emissions. As such, construction and operational emissions from the proposed project would be less-than-significant and would not conflict with any plans policies, or regulations related to GHG emissions.

Additionally, the proposed project would be provided 100 percent renewable energy from the RCEA Repower+ program. This would significantly reduce the indirect GHG emissions generated by electricity consumption during project operation.
Therefore, the proposed project as designed and in compliance with existing laws and regulations, would not generate GHG emissions that would conflict with an applicable plan, policy, or regulation for the purpose of reducing GHG emissions. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

Mitigation Measures: No mitigation required.

Findings: The project would have a **Less-than-significant Impact** on Greenhouse Gas Emissions.

3.2.9 Hazards and Hazardous Materials

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☒	☐

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. It is located on sixteen separate parcels on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 – Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan).

To the north of the project site is rural residential development and timberland. To the east of the site are rural residential and industrial uses. To the south of the site are commercial uses, industrial uses, rural residential uses, Glendale Drive, Highway 299, Hall Creek, and the Mad

River. To the west of the site are rural residential uses, Glendale Drive, Highway 299, and the Mad River.

The closest elementary schools to the project site are Blue Lake Union Elementary, which is approximately 1.5 miles to the southeast of the project site on the south side of Highway 299, and the Pacific Union School, 4.5 miles southwest in the Arcata School District. The two closest high schools are approximately six to seven miles from the site (Arcata High School and McKinleyville High School, respectively).

The closest airport to the project site is the Arcata-Eureka Airport in McKinleyville, which is located approximately 6.5 miles northwest of the project site. The project is not located in the vicinity of any private airstrips.

Fire protection in Humboldt County is provided by local districts, cities, and the California Department of Forestry and Fire Protection (CAL FIRE). The project is located in a State Responsibility Area (SRA), which are identified as areas within the State in which CAL FIRE assumes primary financial responsibility for preventing and suppressing fires. The project site is also within the Blue Lake Fire Protection District (BLFPD). The closest fire station to the project site is the BLFPD main station, which is approximately 1.6 miles to the southeast of the project site on the south side of Highway 299.

The California Department of Forestry and Fire Protection (CAL FIRE) designates Fire Hazard Severity Zones (FHSZ) based on factors such as fuel, slope, and fire weather with varying degrees of fire hazard (such as, moderate, high, and very high). While FHSZ zones do not predict when or where a wildfire will occur, they do identify areas where wildfire hazards could be more severe and therefore are of greater concern. According to CAL FIRE, the project site is located in a FHSZ classified as "moderate" (CAL FIRE, 2021).

Historic Contamination

As discussed in Section 2.2.3 – Historical Use/Environmental Baseline/Existing Condition, the project parcels were historically used for lumber mill operations (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]). When the eastern portion of the site was a lumber mill, the resulting milled wood was treated with preservative solutions. Spillage and drippings of the wood-treating solutions caused pentachlorophenol (PCP) and tetrachlorophenol (TCP) contamination of the green chain area adjacent to the sawmill building (see Figure 21 – Soil and Groundwater Management Plan and Appendix 5.8; SHN, 2021d). The former green chain area is on Assessor's Parcel Numbers (APNs) 516-101-060 and 516-111-063 (see Figure 3 – Assessor Parcel Numbers). Because the lumber mill operations that caused the contamination became bankrupt, the State designated the area as a State Response hazardous materials site (Envirostor ID: 12240115), and the California Department of Toxic Substances Control (DTSC) took the responsibility for investigation and remediation of the site. On December 5, 1994, DTSC approved a Remedial Action Plan (RAP) for the site with several remedial actions (DTSC, 2018):

- Consolidating PCP/TCP-contaminated soils under the former green chain area.
- Installing a reinforced concrete cap and metal structure over the former green chain area on portions of APNs 516-101-060 and 516-111-063.

- Recording a restrictive land use covenant (land use restrictions) controlling site activities that might compromise the integrity of the concrete cap and banning uses including residential, hospital, day-care, and school.
- Monitoring surface and groundwaters for effectiveness of the remedial actions.

DTSC certified the remedial actions at the site on March 9, 1998 (DTSC, 1998). On January 12, 1998, the State and the operating lumber mill company agreed to record a "*Covenant to Restrict Use of Property*" (1998-2896-38) with the land use restrictions on APNs 516-101-060 and 516-111-063. It was recorded on February 4, 1998 (McNamara and Peepe, 1998).

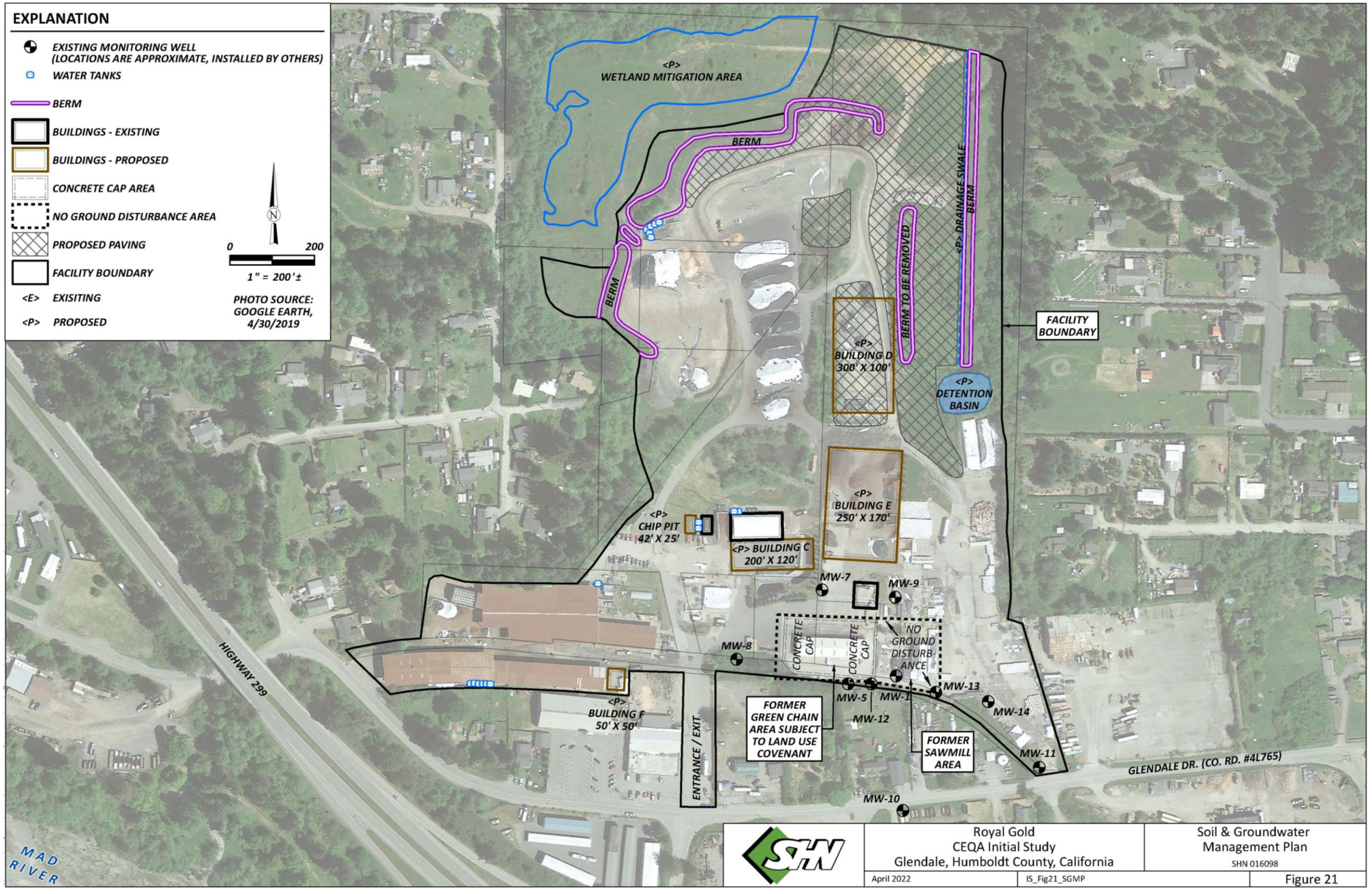
As discussed in Section 2.2.3 – Historical Use/Environmental Baseline/Existing Condition, in 2002, the lumber mill company, Blue Lake Forest Products, Inc., declared bankruptcy and ceased lumber mill operations on the eastern portion of the site. When the lumber mill operations ceased, so did use of the mill's water production well (PW-1). Since 2002, the groundwater elevation appears to have risen approximately 15 feet. The result is that groundwater is in contact with the PCP/TCP impacted soil beneath the concrete cap. The result has been some movement of the contaminants from the soils into the groundwater. Grab groundwater samples collected by DTSC in May 2005 at various locations reported PCP concentrations up to 16,000 micrograms per liter (µg/L) and TCP concentrations up to 1,500 µg/L, respectively. On April 22, 2008, DTSC issued an Imminent and Substantial Endangerment Determination (Docket No. I&SED 07/08-009) for the site, because there had been a release or threatened release of hazardous substances at the site. From December 2003 through May 2017, PCP and TCP have been detected in groundwater monitoring wells at decreased concentrations up to 2,200 µg/L PCP and 120 µg/L TCP (DTSC, 2018).

The former sawmill area located on APNs 516-111-062 and 516-111-063 is partially unpaved and located adjacent to the concrete cap at the former green chain area on APNs 516-101-060 and 516-111-063 (see Figure 3 – Assessor Parcel Numbers, Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date], and Figure 6 – Site Plan). The former sawmill building was demolished in 2006. Portions of the building foundation remain at the former sawmill area and are in poor condition. In 2010 and 2011, DTSC conducted an investigation at the former sawmill area and found PCP concentrations in soil ranging from 1.8 milligrams per kilogram (mg/kg) to 40 mg/kg (DTSC established the PCP cleanup goal of 1.75 mg/kg in the 1994 Remedial Action Plan) (DTSC, 2018).

In 2018, DTSC decertified the 1998 remedial action certification. DTSC stated that the remedial actions in the 1994 RAP were no longer adequate because:

- Rising groundwater levels mobilized PCP/TCP in soil beneath the green chain area.
- Surface water can percolate through PCP/TCP-impacted soil present below the former sawmill infrastructure because it is partially unpaved and/or has a building foundation in poor condition.
- PCP/TCP could migrate offsite in groundwater or surface water runoff from the former sawmill area.

Figure 21: Soil and Groundwater Management Plan



DTSC will have a RAP Amendment prepared to address the soil and groundwater contamination from past lumber mill uses. The RAP Amendment will evaluate a range of alternatives including, but not limited to, capping of the former sawmill area, enhanced biodegradation of chemicals in groundwater, long-term groundwater monitoring, surface water monitoring, and amending the land use covenant with Blue Lake Forest Products, Inc. (DTSC, 2018).

In December 2020, DTSC contracted with SHN Consulting Engineers and Geologists, Inc. to conduct additional investigation at the site and evaluate remediation options. The scope of work for the contract included the following activities (DTSC, 2020):

- Conduct groundwater sampling for PCP, TCP, and dioxins at eight (8) groundwater monitoring wells and prepare a groundwater sampling report.
- Decommission and install a groundwater monitoring well.
- Evaluate remediation options and prepare a remediation evaluation letter report.
- Conduct one (1) round of surface water sampling for PCP, TCP, and dioxins at three (3) locations at the site: upgradient, downgradient, and adjacent to the area of contamination.

In February 2021, SHN collected surface water samples at five (5) locations within and adjacent to the site. As indicated in the report presenting the surface water sample results (SHN, 2021e):

- TCP and 2,3,7,8-Tetrachlorodibenzodioxin (2,3,7,8-TCDD) were not detected in the surface water samples collected during the February sampling event above laboratory reporting limits.
- The reported dioxin toxic equivalency quotient (TEQ) was below the State of California maximum contaminant level for 2,3,7,8-TCDD (30 µg/L), but above the California Public Health Goal (PHG) of 0.05 pg/L.
- PCP was detected in three (3) surface water sample locations below the cap at estimated concentrations that are below the laboratory reporting limit, but above the method detection limit (MDL). PCP concentrations identified in all surface water samples collected during the February sampling event were below the State maximum contaminant level (MCL) permissible in drinking water (1.0 µg/L) and the California PHG (0.3 µg/L).

In March 2021, SHN conducted groundwater monitoring at eight (8) groundwater monitoring wells within and adjacent to the site. As indicated in the report presenting the groundwater monitoring sample results (SHN, 2021a):

- 2,3,7,8-TCDD was not detected at concentrations above laboratory detection limits in any samples collected during the sampling event.
- Chlorinated Phenols:
    - PCP was detected at concentrations exceeding the state maximum contaminant level (MCL) of 1.0 µg/L in MW-1, MW-5, and MW-12.
    - The maximum concentration of PCP detected in groundwater was in well MW-1 at a concentration of 460.0 µg/L.

- TCP was detected in well MW-1 at a concentration of 5.6 µg/L and in well MW-5 at 0.81 µg/L (estimated concentration below the laboratory reporting limit, but above the method detection limit).
- Chlorinated phenols were only detected in groundwater from wells directly adjacent to and downgradient from the cap. No chlorinated phenols were identified in wells located further downgradient of the cap (MW-10 and MW-11).

Based on the results of the recent surface and groundwater sampling, DTSC is in the process of amending its contract with SHN to include the following additional tasks (DTSC, 2021):

- Two additional rounds of surface water sampling.
- Two additional rounds of groundwater monitoring.
- Installation of 2 groundwater monitoring wells to the east of MW-1 to evaluate the extent of the plume (see Figure 21 – Soil and Groundwater Management Plan).
- Contract with Prima Environmental to conduct a bench scale study to evaluate biodegradation methods of chemicals of concern in soil and groundwater.

Royal Gold Use of Restricted Area

Royal Gold leases APNs 516-101-060 and 516-111-063 from Blue Lake Forest Products, Inc., which have the original concrete cap and a metal structure, to store raw materials including commercially produced compost. Such use is allowed by the land use covenant, as confirmed by DTSC (see Figure 6 – Site Plan). DTSC has indicated that when further remediation activities occur in the area within and around the concrete cap and the area of the former sawmill building, that Royal Gold will need to vacate this area.

Royal Gold Improvements Requiring Excavation

Some of the company's stormwater management improvements required the excavation of soils. The excavations were in areas outside of the land use covenant restricted area and outside of the area containing the former sawmill building. The excavated soils were stockpiled, covered with tarps, and sampled for various contaminants related to former lumber mill activity (for example, wood treating solutions, dioxins, petroleum hydrocarbons, etc.). On November 15, 2017, DTSC staff concluded that the test results for the soil samples from the stockpiles were below the regulatory screening levels for residential uses of such soils. The DTSC stated in a letter (DTSC, 2017), "*Based on the results of the sampling, the stockpiled soils are below the levels DTSC uses for screening soil for unrestricted uses*." The DTSC also stated:

> "*In addition, DTSC is not aware of any residual contamination above unrestricted screening levels at the McNamara & Peepe site except within the capped area identified in the recorded land use covenant (1998-2896-38), a small area of contamination just east of the capped area between the former green chain and the former lumber mill, and in groundwater beneath these areas. Contamination in the uncapped area is not at the surface and is documented in the December 16, 2010 and the February 21, 2012 Technical Memorandums prepared by URS Corporation*."

Based on the sampling results and DTSC determination, the excavated soils were properly disposed of by reusing them in a manner consistent with the determination. This was done through the reuse of the soils as subbase for paved areas onsite.

Regulatory Setting:

Unified Program and California Environmental Reporting System (CERS)

The California Environmental Protection Agency (CalEPA) oversees California's "Unified Program." The program protects Californians from hazardous waste and hazardous materials by ensuring local regulatory agencies consistently apply statewide standards when they issue permits, conduct inspections, and engage in enforcement activities.

The CalEPA Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of six environmental and emergency response programs in California. These six programs (and their corresponding state oversight agencies) are:

- Hazardous Materials Release Response Plans and Inventories (Business Plans) - California Governor's Office of Emergency Services (CalOES)
- California Accidental Release Prevention (CalARP) Program - California Governor's Office of Emergency Services (CalOES)
- Underground Storage Tank (UST) Program - California State Water Resources Control Board (SWRCB)
- Aboveground Petroleum Storage Act (APSA) - Office of the State Fire Marshal (CAL FIRE-OSFM)
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs - DTSC
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements - Office of the State Fire Marshal (CAL FIRE-OSFM)

The Humboldt County Division of Environmental Health is the local Certified Unified Program Agency (CUPA) that implements the CalEPA's Unified Program.

Analysis:

a) *Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*
Less-than-significant Impact.

Construction

Construction of the project would require the temporary use and transport of paints, fuels, oils, solvents, and other chemicals used during construction activities. Improper use and transportation of hazardous materials could result in accidental releases or spills, potentially posing health risks to workers, the public, and the environment. These activities are controlled by County code provisions and state and federal regulations. Throughout the

transport, use, or disposal of potentially hazardous materials, the contractor is required to employ standard cleanup and safety procedures to minimize the potential for public exposure from accidental releases of such substances into the environment.

Operation
In its business, Royal Gold stores and uses several hazardous materials, and thus is required to comply with the CalEPA Unified Program. Royal Gold files information about hazardous materials with CERS (ID: 10330909 and Facility ID: 12-000-001492; CalEPA, 2020). CERS is the statewide web-based system that supports the electronic exchange of required Unified Program information among businesses, local governments, and the U.S. EPA.

Such information from companies includes, but is not limited to, facility data regarding regulated hazardous material activities (for example, hazardous materials business plans, site maps, chemical inventories, etc.), underground and aboveground storage tanks, hazardous waste generation, and inspection, compliance, and enforcement actions. Royal Gold has prepared and filed an Emergency Response/Contingency Plan and Employee Training Plan, as well as a Hazardous Materials and Wastes Inventory Report on the CERS system. The hazardous materials at the company's operations include:

- Liquefied petroleum gas
- Diesel fuel
- Gasoline
- Motor oil
- Waste oil
- Waste oily absorbent
- Acetylene
- Oxygen

As noted in Section 2.3.3 – Proposed Improvement/Operational Changes, Royal Gold proposes a new fueling station that would include a 5,000-gallon tank for diesel fuel. The fueling station will be located away from waterways and combustible materials as recommended by the National Fire Protection Association (NFPA). The new tank would be a double-wall steel tank that meets UL-2085 standards and all relevant building and fire codes for California. The tank would be installed on a concrete pad and a metal structure would be erected above the fuel tank to prevent stormwater from contacting the tank or pumps. It is expected that the Royal Gold facility would be regulated as a Tier 1 qualified facility and would comply with the requirements of a Tier 1 Spill Prevention, Control, and Countermeasure (SPCC) plan.

With appropriate storage, handling, and application practices that comply with federal, state, and local laws and regulations, it is not anticipated that the use of hazardous materials by Royal Gold will pose a significant hazard to the public or the environment.

As such, through compliance with existing regulations (such as CalEPA Unified Program), the proposed project will not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials during either

construction or operation. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

b) *Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*
Less-than-significant Impact.

Construction
As noted above, construction of the project would require the temporary use and transport of paints, fuels, oils, solvents, and other chemicals used during construction activities. Improper use and transportation of hazardous materials could result in accidental releases or spills, potentially posing health risks to workers, the public, and the environment. These activities are controlled by County code provisions and state and federal regulations. The contractor is required to employ standard cleanup and safety procedures to minimize the potential for public exposure from upset and accident conditions involving the release of hazardous materials into the environment. Additionally, construction activities at the project site would require implementation of a Storm Water Pollution Prevention Plan (SWPPP) that would incorporate current best management practices (BMPs) for construction, including site housekeeping practices, hazardous material storage, inspections, maintenance, worker training in pollution prevention measures, and secondary containment of releases to prevent pollutants from being carried off-site via runoff.

Operation
As discussed above, Royal Gold stores and uses several hazardous materials, and thus is required to comply with the CalEPA Unified Program. Royal Gold files information about hazardous materials with CERS (ID: 10330909 and Facility ID: 12-000-001492). CERS is the statewide web-based system that supports the electronic exchange of required Unified Program information among businesses, local governments, and the U.S. EPA.

Such information from companies includes, but is not limited to, facility data regarding regulated hazardous material activities (for example, hazardous materials business plans, site maps, chemical inventories, etc.), underground and aboveground storage tanks, hazardous waste generation, and inspection, compliance, and enforcement actions. Royal Gold has prepared and filed an Emergency Response/Contingency Plan and Employee Training Plan, as well as a Hazardous Materials and Wastes Inventory Report on the CERS system. The hazardous materials at the company's operations include:

- Liquefied petroleum gas
- Diesel fuel
- Gasoline
- Motor oil
- Waste oil
- Waste oily absorbent
- Acetylene

- Oxygen

With appropriate storage, handling, and application practices that comply with federal, state, and local laws and regulations, it is not anticipated that the use of hazardous materials by Royal Gold will pose a significant hazard to the public or the environment.

As such, through compliance with existing regulations (such as CalEPA Unified Program), the proposed project will not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

c) *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*
Less-than-significant Impact.

The project is not located within one-quarter mile of an existing or proposed school. The closest school to the project site is Blue Lake Union Elementary, which is approximately 1.5 miles to the southeast of the project site on the south side of Highway 299. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

d) *Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?*
Less-than-significant with Mitigation Incorporated.

As discussed in the Setting, there is legacy contamination at the project site from when the site was historically used for lumber mill operations. Contaminants have been found in soil, groundwater, and surface water samples collected from the former McNamara & Peepe (M&P) lumber mill, which was historically located on a portion of the Royal Gold site (see Figure 21 – Soil and Groundwater Management Plan and Appendix 5.8; SHN, 2021d).

The proposed site improvements have the potential to result in ground disturbance that could uncover unknown areas of contamination at the site and potentially create a significant hazard to the public or the environment. For this reason, a Soil and Groundwater Management Plan (SGMP) has been prepared (see Appendix 5.8; SHN, 2021d) and its implementation for future ground-disturbing activities at the site is incorporated as Mitigation Measure HHM-1. The SGMP addresses recommendations for characterization of soil and groundwater impacted by potential site contaminants (PSCs) prior to proposed construction activities for worker safety, potential onsite reuse or offsite disposal, and management of excavated material at the property. The SGMP provides recommended guidance to protect site construction workers, the public, and the environment from PSCs in soil and/or groundwater encountered during site activities. The SGMP includes recommended actions to address handling, onsite reuse, and offsite disposal of contaminated soil and/or groundwater, if necessary. The objective of the SGMP is to ensure that no significant impacts occur to nearby sensitive receptors, aquatic species, and water resources.

The SGMP will be provided to and used by Royal Gold staff, and training will be provided regarding adherence to its recommendations. The SGMP shall also be provided to contractors prior to conducting work at the site involving ground disturbance.

With the incorporation of Mitigation Measure HHM-1, the project will not create a significant hazard to the public or the environment. Therefore, the proposed project would result in a less-than-significant impact with mitigation incorporated on this category of environmental effect.

e) *For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?*
No Impact.

The closest airport to the project site is the Arcata-Eureka Airport in McKinleyville, which is located approximately 6.5 miles northwest of the project site. Therefore, the proposed project will result in no impact on this category of environmental effect.

f) *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*
Less-than-significant Impact.

The County of Humboldt has an adopted Emergency Operations Plan (Humboldt County, 2015). However, the proposed project is not of the nature to physically interfere with emergency response or emergency evacuation. The Royal Gold facility is located on a site previously used for lumber mill operations, which was designed to accommodate industrial truck traffic, and is located along the original highway through the Mad River Valley. Furthermore, the project site's proximity to Highway 299 (approximately 500 feet) provides adequate access and response to the site in an emergency situation. Through the Conditional Use Permit process, the BLFPD has conducted site visits and advised Royal Gold on the required design for the facility access roads to meet fire code requirements for emergency access. This includes installing a Knox Lock or other similar rapid entry system on the main entrance gate to allow the BLFPD and other emergency responders to have access to the site in case of an emergency (e.g., fire, medical emergency, etc.). Figure 22 – Fire Suppressions and Access Map shows the location of the designated fire access roads at the project site, which Royal Gold has improved and maintained to comply with emergency access standards. Based on the location and design of the project site, and compliance with emergency access standards, the proposed project is not expected to interfere with emergency response or evacuation in the project area.

Therefore, the proposed project would not impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

g) *Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?*
Less-than-significant Impact.

Fire protection in Humboldt County is provided by local districts, cities, and the California Department of Forestry and Fire Protection (CAL FIRE). The project is located in an SRA, which are identified as areas within the State in which CAL FIRE assumes primary financial responsibility for preventing and suppressing fires. The project site is also within the BLFPD. The closest fire station to the project site is the BLFPD main station, which is approximately 1.6 miles to the southeast of the project site on the south side of Highway 299.

CAL FIRE designates FHSZs based on factors such as fuel, slope, and fire weather with varying degrees of fire hazard (such as, moderate, high, and very high). While FHSZ zones do not predict when or where a wildfire will occur, they do identify areas where wildfire hazards could be more severe and therefore are of greater concern. According to CAL FIRE, the project site is located in a FHSZ classified as "moderate" (CAL FIRE, 2021).

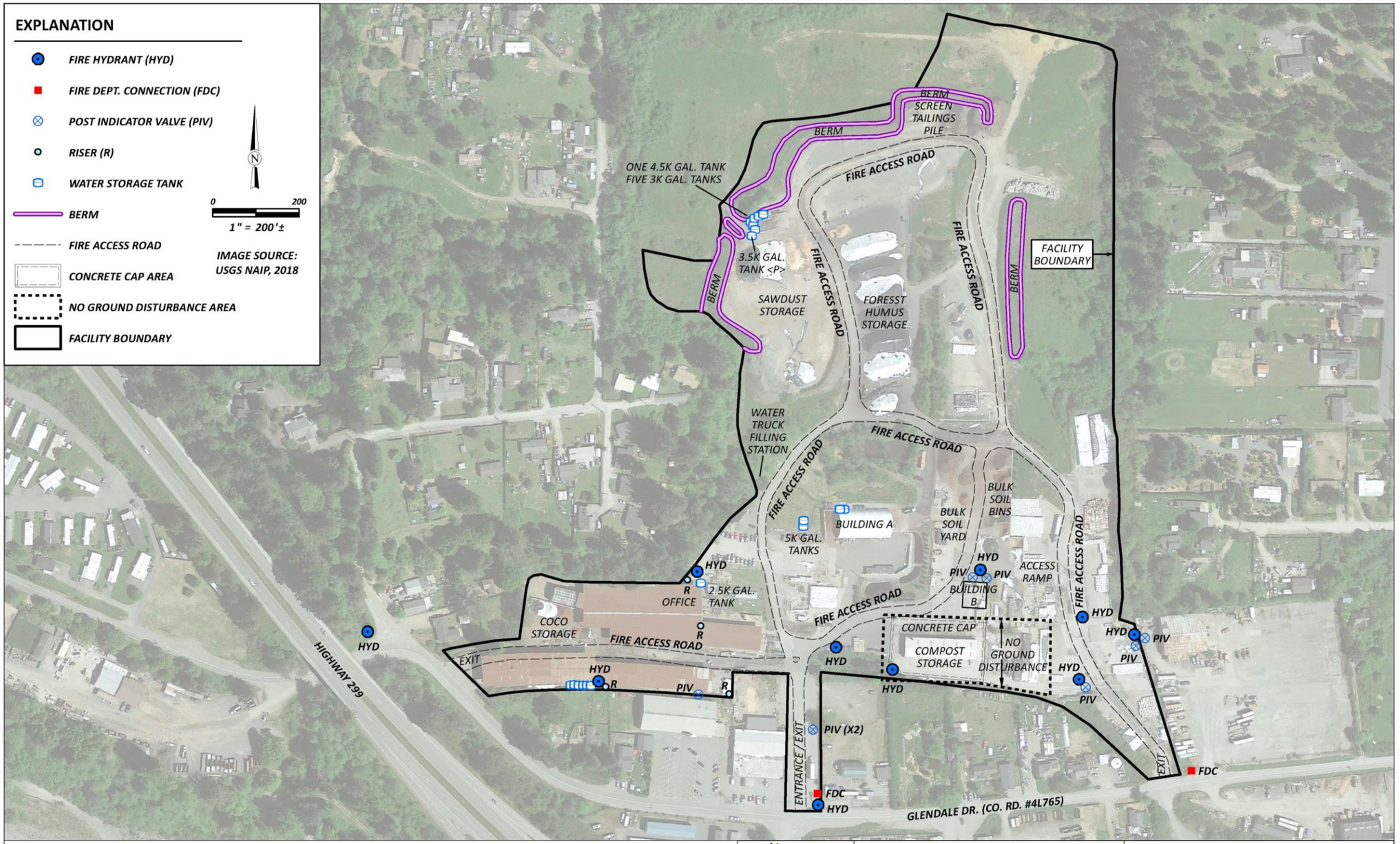
The Royal Gold facility has a variety of existing fire suppression infrastructure elements that were historically installed by others when the site was used for lumber milling activity and other industrial uses. The company has maintained and improved some of this infrastructure to meet the needs of its business and comply with current fire code requirements. Royal Gold has also installed several water storage tanks, which are available for fire suppression purposes. Through the Conditional Use Permit process, the BLFPD has conducted site visits and advised Royal Gold on the following: 1) fire suppression infrastructure in need of inspection and repair; and 2) the required design for the facility access roads to meet fire code requirements for emergency access. Royal Gold has contracted with Frontier Fire Protection to inspect the fire suppression infrastructure at the site and conduct the needed repairs. Royal Gold has also improved and maintained the facility access roads to comply with emergency access standards. Figure 22 – Fire Suppression and Access Map shows the existing fire suppression infrastructure at the site as well as the designated fire access roads.

The project site is located within 500 feet of Highway 299 and is surrounded by rural residential development and timberland to the north, rural residential and industrial uses to the east, commercial uses, industrial uses, rural residential uses to the south, and rural residential uses to the west. As noted, CAL FIRE designates the project site as being located in a "moderate" Fire Hazard Severity Zone (CAL FIRE, 2021). However, the project site does not exhibit topography, vegetation patterns, or other factors (for example, fuels, aspect, etc.) that would expose people or structures to a significant risk of wildland fires. The project site's proximity to Highway 299 provides adequate access and response to the site in an emergency situation. Furthermore, the proposed project is consistent with the surrounding land uses and would not introduce or exacerbate wildfire risks.

Due to the project site characteristics, the nature of the proposed project, existing development surrounding the project site, and site accessibility in an emergency situation, the proposed project will not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized area or

where residences are intermixed with wildlands. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

Figure 22: Fire Suppression and Access Map



	Royal Gold CEQA Initial Study Glendale, Humboldt County, California	Fire Suppression and Access Map SHN 016098	
	October 2021	IS_Fig22_FireSuppressionAndAccess	Figure 22

Mitigation Measures:

HHM-1. Soil and Groundwater Management Plan: Due to potential remaining contamination on the project site from past lumber mill uses, the applicant shall implement the Soil and Groundwater Management Plan (SGMP) for all future ground-disturbing activities (see Appendix 5.8; SHN, 2021d). The SGMP addresses recommendations for characterization of soil and groundwater impacted by potential site contaminants (PSCs) prior to proposed construction activities for worker safety, potential onsite reuse or offsite disposal, and management of excavated material at the property. The SGMP provides recommended guidance to protect site construction workers, the public, and the environment from PSCs in soil and/or groundwater encountered during site activities. The SGMP includes recommended actions to address handling, onsite reuse, and offsite disposal of contaminated soil and/or groundwater, if necessary. The objective of the SGMP is to ensure that no significant impacts occur to nearby sensitive receptors, aquatic species, and water resources. The SGMP will be provided to and used by Royal Gold staff, and training will be provided regarding adherence to its recommendations. The SGMP shall also be provided to contractors prior to conducting work at the site involving ground disturbance.

Findings: The project will have a **Less-than-significant Impact with Mitigation Incorporated** on Hazards and Hazardous Materials.

3.2.10 Hydrology and Water Quality

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	☐	☒	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i. result in substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
iv. impede or redirect flood flows?	☐	☐	☒	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☒	☐	☐

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, stormwater improvements, filling of wetlands, wetland mitigation, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. It is located on sixteen separate APNs on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 – Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan).

To the north of the site is rural residential development and timberland. To the east of the site are rural residential and industrial uses. To the south of the site are commercial uses, industrial uses, rural residential uses, Glendale Drive, Highway 299, Hall Creek, and the Mad River. To the west of the site are rural residential uses, Glendale Drive, Highway 299, and the Mad River.

Mad River Watershed and Geology

The Mad River is located approximately 800 feet south of the Royal Gold facility. According to the California ArcGIS "Industrial Storm Water Map," the facility is located within the Lower Mad River Watershed (HUC 1801010204 ID) in the North Coast Region (State Water Resources Control Board [SWRCB], 2021a). The North Coast Regional Water Quality Control Board (North Coast RWQCB) adopts and implements the Water Quality Control Plan (Basin Plan) for the North Coast Region which identifies beneficial uses and recognizes water quality problems unique to the region. The Mad River is Clean Water Act Section 303(d) listed for sedimentation/siltation, temperature, and aluminum (North Coast RWQCB, 2021b).

Locally, the Mad River watershed is underlain by the Franciscan Complex of upper Jurassic through Cretaceous age assemblage of rock (Strand, 1962). The compilation of regional geologic mapping by McLaughlin et al. (2000) subdivides the Franciscan Complex into the Eastern, Central, and Coastal belts (Stillwater, 2010). The three belts are progressively younger in age from east to west. The Eastern and Central belts of the Franciscan Complex comprise a majority of the Mad River watershed (Strand, 1962). The Eastern belt of the Franciscan Complex occurs in the eastern part of the Mad River basin and consists predominantly of moderately metamorphosed greywacke sandstone. The Eastern belt in the Mad River basin also includes the South Fork Mountain Schist, comprised of schistose metasedimentary and metavolcanic rocks which have been highly sheared, folded, and metamorphosed. The Central belt of the Franciscan Complex occurs in the western part of the Mad River basin. The Central belt consists predominantly of a mélange matrix of sheared argillite surrounding blocks of more coherent broken and folded schist, greywacke sandstone, and shale (McLaughlin et al., 2000). The coherent blocks may also include chert, greenstone, limestone, and metabasalt.

Nearly ninety percent of the mass of the Earth's crust is made up of the four major elements: oxygen (approximately 50%), silicon (approximately 30%), aluminum (approximately 8%) and iron (approximately 5%). In 1996, the Kearney Foundation published "Background Concentrations of Trace and Major Elements in California Soils," a study of 50 benchmark soils collected throughout the state (Kearney, 1996). Findings of the study indicated that aluminum and iron concentrations in California soils are commensurate with crust concentrations. That is, aluminum concentrations range from 3.0 to 10.6 percent (average 7.3 percent), and iron concentrations range from 1.0 to 8.7 percent (average 3.7 percent) in California soil samples (Kearney, 1996).

The findings of the Kearney Foundation study show higher concentrations of several elements including aluminum and iron in Northern California soil compared to southern California soils. Presumably the higher concentrations originate from high levels of these elements in ultramafic and volcanic rocks mapped in the area (Strand, 1962; Jennings, 1977; McLaughlin et al., 2000; Kearney, 1996). Specifically, northwestern California soils average aluminum concentrations are 8.3 percent and average iron concentrations are 4.4 percent (Kearney, 1996).

Based on analytical laboratory results of surface water samples collected through the Surface Water Ambient Monitoring Program (SWAMP) through the State Water Resources Control Board (SWRCB), the United States Environmental Protection Agency (EPA) has listed nearly all watersheds that primarily lie within Franciscan Complex geology including the Eel River, Mad River, Trinity River, Redwood Creek, as impaired for aluminum (SWRCB, 2018). While the

2018 integrated report indicates the sources of aluminum along the Mad River are unknown, Decision 12333 from the 2010 Integrated report by the SWRCB indicate the source of aluminum along the Eel River is from "natural sources" (SWRCB, 2010). That is, the SWRCB recognizes that regional rock types are contributing to exceedances of the aluminum water quality standard in the Eel River watershed. It would be logical to conclude that the source of aluminum in the other locally aluminum impaired watersheds, is the same regional Franciscan geology.

Site Surface Water Features

Surface water features at the project site include seasonal wetlands that occur within the northwestern and central portions of the project site and several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site (see Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year [2009] and Figure 15 – Delineated Wetlands). Freshwater emergent wetlands occur along the fringes of the developed project area, in areas that collect water and have not been disturbed since the closure of the mill. An Ordinary High Water Mark (OHWM) occurs within the drainageway along the northwestern border of the project area, within an excavated channel. The drainage meets the characteristics of a channelized second-order stream (SHN, 2018c).

Site Stormwater Management

The Royal Gold facility is relatively flat and slopes generally to the south. Elevations at the project site range from approximately 90 feet above sea level in the south to approximately 125 feet in the north. Approximately 67 percent of the facility is now comprised of impervious surfaces, including roof tops, shelters, paved roadways, and concrete and asphalt paved areas (see Appendix 5.9; SHN, 2021c).

Currently, stormwater discharge from the western portion of the project site flows to the southwest into roadside drainage ditches along Glendale Drive that discharge to the Mad River. Stormwater discharges from the central and eastern portions of the site flow to the south through a series of stormwater drainage ditches and culverts on adjacent private property, which discharge into Hall Creek and ultimately the Mad River. Stormwater discharge from the northwestern corner of the facility flows to the north through a bioswale into a vegetated buffer. See Figure 23 – Drainage Connectivity Map, which shows how stormwater runoff from the project site flows to Hall Creek and the Mad River.

Management and treatment of stormwater generated from ongoing industrial use of the site is subject to the regulation and permitting by the State Water Resources Control Board (SWRCB). Pursuant to the Statewide General Permit for Storm Water Discharges Associated with Industrial Activities (Industrial General Permit or IGP) (SWRCB Order 2014-0057-DWQ as amended in 2015 and 2018) (SWRCB, 2021b), businesses in specified Standard Industrial Classification (SIC) codes must implement the IGP. Royal Gold's operations are in SIC Code 2875 (Fertilizers, Mixing Only). This includes mixed potting soil and fertilizers, which is the primary activity at this facility. As such, Royal Gold requires IGP coverage and has been assigned Waste Discharger Identification Number (WDID) No. 1 12I025790. Royal Gold complies with the IGP with a Stormwater Pollution Prevention Plan (SWPPP), which is periodically updated for current operational conditions.

As part of past industrial use of the project site, numerous stormwater drainage and management features were historically constructed (by others) that ultimately discharge to the Mad River. Royal Gold has improved these historical stormwater features and also constructed new stormwater management features throughout the site to comply with the requirements of the SWRCB IGP and the settlement agreement with Humboldt Baykeeper (see Section 2.2.3 – Historical Use/Environmental Baseline/Existing Condition). Existing stormwater management features at the project site are identified in the current SWPPP (see Appendix 5.9; SHN, 2021c) and include, but are not limited to, detention basins, bioswales, lined ditches, floating treatment islands, sediment traps, gravel bags, check dams, fiber media socks, drainage ditches, drainage inlets, culverts, and stormwater piping. See Figure 13 – SWPPP BMP Location Map, which shows the existing stormwater management features at the site and the ten locations of stormwater discharge from the site. Also, Royal Gold has constructed several buildings which now cover materials storage and processing areas such as Building A, Building B, and the addition to the amendment storage building. These stormwater management improvements have resulted in significant reductions in the pollutant concentrations detected in stormwater discharging from the facility.

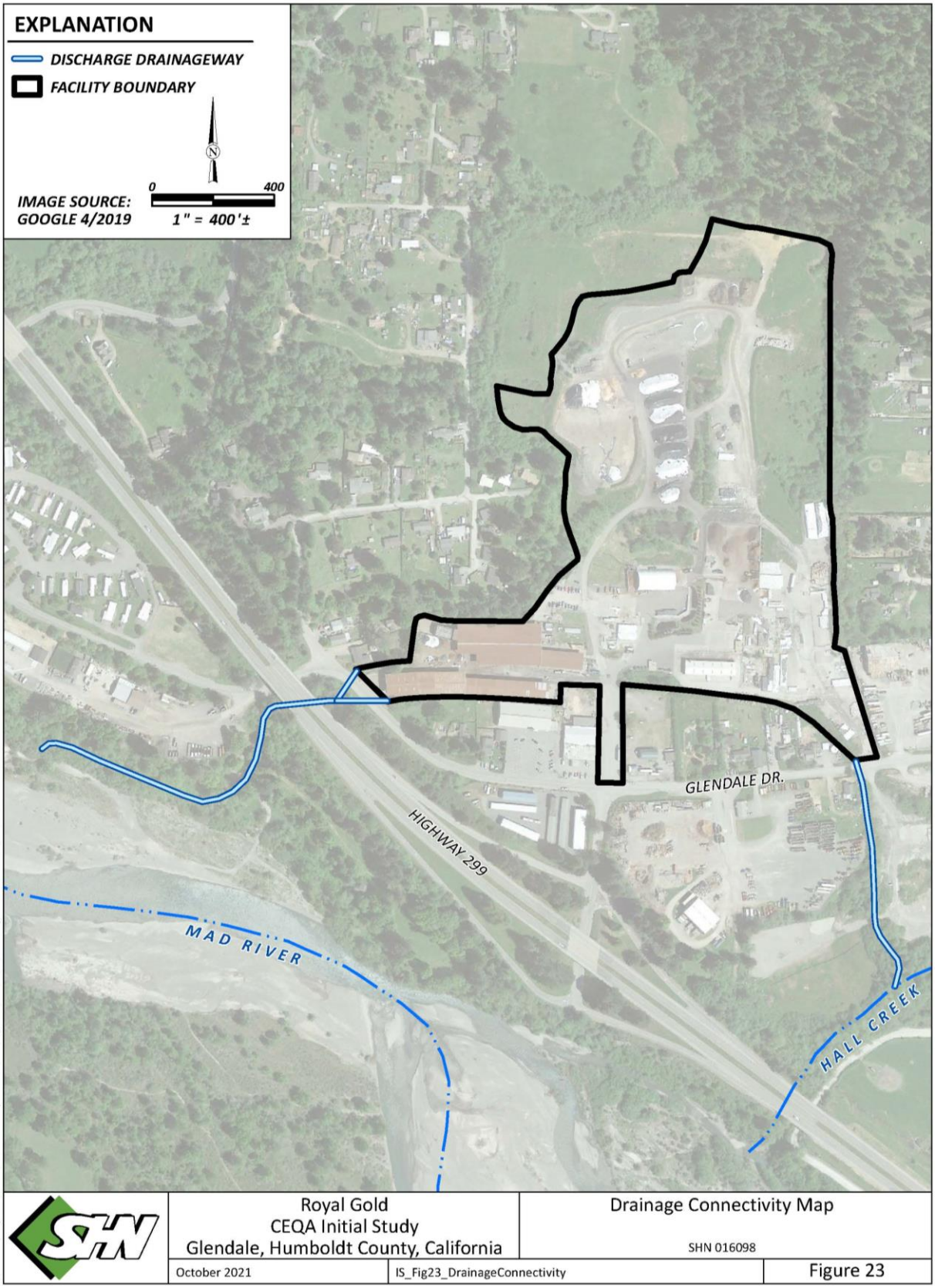
Water Supply

The Fieldbrook-Glendale Community Services District (FGCSD) provides water service to the project site. FGCSD buys water from the Humboldt Bay Municipal Water District (HBMWD), which is piped from its original source – subsurface wells on the Mad River upstream of the City of Arcata. FGCSD's website states that according to 2014 HBMWD records, FGCSD's average daily use was 159,000 gallons per day (gpd) and peak daily use was 240,000 gpd. Availability of connections within the FGCSD water system is not limited by source, but by FGCSD's contract with the HBMWD (430,000 million gpd). As such, the HBMWD has sufficient water supply to meet FGCSD's demands (FGCSD, 2021), and FGCSD has sufficient water supply to meet the demands of the proposed project.

Wastewater Collection, Treatment, and Disposal

Wastewater collection is provided to the project site by the FGCSD, which contracts with the City of Arcata for sanitary sewer treatment and disposal. The FGCSD designates the company as a Significant Industrial User and has issued Royal Gold a Wastewater Discharge Permit (#2020-01) authorizing discharges of industrial wastewater (FGCSD, 2020). The Permit has discharge standards, flow limitations, and monitoring, sampling, and reporting requirements. Wastewater being discharged to the sewers is primarily runoff from coco fiber hydration with a minimal contribution from existing bathroom facilities at the site. The industrial wastewater is stored in tanks to lower the discharge rate and allow wastewater to be discharged continuously, seven days per week instead of only when the process water is running off from the coco hydration system.

Figure 23: Drainage Connectivity Map



Onsite pretreatment of industrial wastewater involves the use of collection tanks which act as passive sediment traps as well as removal of sediment from the effluent through a vibratory separator. Other than the outflow from the coco hydration, the only other connections to the sewer are two toilets and two sinks (FGCSD, 2020). The company also has portable chemical toilets on site that are maintained and serviced by a sanitary service provider.

Flooding

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA also issues Flood Insurance Rate Maps identifying which land areas are subject to flooding. The maps provide flood information and identify flood hazard zones in each community. The design standard for flood protection is established by FEMA, with the minimum level of flood protection for new development determined to be the 1-in-100 annual exceedance probability (such as the 100-year flood event). The project site is not within a 100-year flood hazard area as shown on FEMA Community Panel No. 06023C0694F (FEMA, 2016). The FEMA map shows that the project site is located in an area of minimal flooding (no shading). According to the inundation mapping approved by the California Department of Water Resources Division of Safety of Dams, the project site is outside of the area that would be subject to flooding from failure of the R.W. Matthews Dam at the Ruth Reservoir (CDWR, 2021).

Historic Contamination

As discussed in Section 2.2.3 – Historical Use/Environmental Baseline/Existing Condition, the project parcels were historically used for lumber mill operations (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]). When the eastern portion of the site was a lumber mill, the resulting milled wood was treated with preservative solutions. Spillage and drippings of the wood-treating solutions caused pentachlorophenol (PCP) and tetrachlorophenol (TCP) contamination of the green chain area adjacent to the sawmill building (see Figure 21 – Soil and Groundwater Management Plan and Appendix 5.8; SHN, 2021d). The former green chain area is on APNs 516-101-060 and 516-111-063 (see Figure 3 – Assessor Parcel Numbers). After the company went bankrupt who owned and managed the lumber mill during the period where operations caused the contamination, the area became designated as a State Response hazardous materials site (Envirostor ID: 12240115), and the California Department of Toxic Substances Control (DTSC) took the responsibility for investigation and remediation of the site. On December 5, 1994, DTSC approved a Remedial Action Plan (RAP) for the site with several remedial actions (DTSC, 2018):

- Consolidating PCP/TCP-contaminated soils under the former green chain area.
- Installing a reinforced concrete cap and metal structure over the former green chain area on portions of APNs 516-101-060 and 516-111-063.
- Recording a restrictive land use covenant (land use restrictions) controlling site activities that might compromise the integrity of the concrete cap and banning uses including residential, hospital, day-care, and school.
- Monitoring surface and groundwaters for effectiveness of the remedial actions.

DTSC certified the remedial actions at the site on March 9, 1998 (DTSC, 1998). On January 12, 1998, the State and the operating lumber mill company agreed to record a "*Covenant to Restrict Use of Property*" (1998-2896-38) with the land use restrictions on APNs 516-101-060 and 516-111-063. It was recorded on February 4, 1998 (McNamara and Peepe, 1998).

As discussed in Section 2.2.3 – Historical Use/Environmental Baseline/Existing Condition, in 2002 the lumber mill company, Blue Lake Forest Products, Inc., declared bankruptcy and ceased lumber mill operations on the eastern portion of the site. When the lumber mill operations ceased, so did use of the mill's water production well (PW-1). Since 2002, the groundwater elevation appears to have risen approximately 15 feet. The result is that groundwater is in contact with the PCP/TCP impacted soil beneath the concrete cap. The result has been some movement of the contaminants from the soils into the groundwater. Grab groundwater samples collected by DTSC in May 2005 at various locations reported PCP concentrations up to 16,000 micrograms per liter (µg/L) and TCP concentrations up to 1,500 µg/L. On April 22, 2008, DTSC issued an Imminent and Substantial Endangerment Determination (Docket No. I&SED 07/08-009) for the site, because there had been a release or threatened release of hazardous substances at the site. From December 2003 through May 2017, PCP and TCP have been detected in groundwater monitoring wells at decreased concentrations up to 2,200 µg/L PCP and 120 µg/L TCP (DTSC, 2018).

The former sawmill area located on APNs 516-111-062 and 516-111-063 is partially unpaved and located adjacent to the concrete cap at the former green chain area on APNs 516-101-060 and 516-111-063 (see Figure 3 – Assessor Parcel Numbers, Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date], and Figure 6 – Site Plan). The former sawmill building was demolished in 2006. Portions of the building foundation remain at the former sawmill area and are in poor condition. In 2010 and 2011, DTSC conducted an investigation at the former sawmill area and found PCP concentrations in soil ranging from 1.8 milligrams per kilogram (mg/kg) to 40 mg/kg. DTSC established the PCP cleanup goal of 1.75 mg/kg in the 1994 Remedial Action Plan (DTSC, 2018).

In 2018, DTSC decertified the 1998 remedial action certification. DTSC stated that the remedial actions in the 1994 RAP were no longer adequate because:

- Rising groundwater levels mobilized PCP/TCP in soil beneath the green chain area.
- Surface water can percolate through PCP/TCP-impacted soil present below the former sawmill infrastructure because it is partially unpaved and/or has a building foundation in poor condition.
- PCP/TCP could migrate offsite in groundwater or surface water runoff from the former sawmill area.

DTSC will have a RAP Amendment prepared to address the soil and groundwater contamination from past lumber mill uses. The RAP Amendment will evaluate a range of alternatives including, but not limited to, capping of the former sawmill area, enhanced biodegradation of chemicals in groundwater, long-term groundwater monitoring, surface water monitoring, and amending the land use covenant with Blue Lake Forest Products, Inc. (DTSC, 2018).

In December 2020, DTSC contracted with SHN to conduct additional investigation at the site and evaluate remediation options. The scope of work for the contract included the following activities (DTSC, 2020):

- Conduct groundwater sampling for PCP, TCP, and dioxins at eight (8) groundwater monitoring wells and prepare a groundwater sampling report.
- Decommission and install a groundwater monitoring well.
- Evaluate remediation options and prepare a remediation evaluation letter report.
- Conduct one (1) round of surface water sampling for PCP, TCP, and dioxins at three (3) locations at the site: upgradient, downgradient, and adjacent to the area of contamination.

In February 2021, surface water samples were collected at five (5) locations within and adjacent to the site. As indicated in the report presenting the surface water sample results (SHN, 2021e):

- TCP and 2,3,7,8-Tetrachlorodibenzodioxin (2,3,7,8-TCDD) were not detected in the surface water samples collected during the February sampling event above laboratory reporting limits.
- The reported dioxin equivalency quotient (TEQ) was below the State of California maximum contaminant level for 2,3,7,8-TCDD (30 µg/L), but above the California Public Health Goal (PHG) of 0.05 pg/L.
- PCP was detected in three (3) surface water sample locations below the cap at estimated concentrations that are below the laboratory reporting limit, but above the method detection limit (MDL). PCP concentrations identified in all surface water samples collected during the February sampling event were below the State maximum contaminant level (MCL) permissible in drinking water (1.0 µg/L) and the California PHG (0.3 µg/L).

In March 2021, groundwater monitoring was conducted at eight (8) groundwater monitoring wells within and adjacent to the site. As indicated in the report presenting the groundwater monitoring sample results (SHN, 2021a):

- 2,3,7,8-TCDD was not detected at concentrations above laboratory detection limits in any samples collected during the sampling event.
- Chlorinated Phenols:
    - PCP was detected at concentrations exceeding the State MCL of 1.0 µg/L in MW-1, MW-5, and MW-12.
    - The maximum concentration of PCP detected in groundwater was in well MW-1 at a concentration of 460 µg/L.
    - TCP was detected in well MW-1 at a concentration of 5.6 µg/L and in well MW-5 at 0.81 µg/L (estimated concentration below the laboratory reporting limit, but above the method detection limit).
    - Chlorinated phenols were only detected in groundwater from wells directly adjacent to and downgradient from the cap. No chlorinated phenols were identified in wells located further downgradient of the cap (MW-10 and MW-11).

Based on the results of the recent surface and groundwater sampling, DTSC is in the process of amending its contract with SHN to include the following additional tasks (DTSC, 2021):

- Two additional rounds of surface water sampling.
- Two additional rounds of groundwater monitoring.
- Installation of two groundwater monitoring wells to the east of MW-1 to evaluate the extent of the plume (see Figure 21 – Soil and Groundwater Management Plan).
- Contract with Prima Environmental to conduct a bench scale study to evaluate biodegradation methods of chemicals of concern in soil and groundwater.

Royal Gold use of Restricted Area

Royal Gold leases APNs 516-101-060 and 516-111-063 from Blue Lake Forest Products, Inc., which have the original concrete cap and a metal structure, to store raw materials including commercially produced compost. Such use is allowed by the land use covenant, as confirmed by DTSC (see Figure 6 – Site Plan). DTSC has indicated that when further remediation activities occur in the area within and around the concrete cap and the area of the former sawmill building, Royal Gold will need to vacate this area.

Royal Gold Improvements Requiring Excavation

Some of the company's stormwater management improvements required the excavation of soils. The excavations were in areas outside of the land use covenant restricted area and outside of the area containing the former sawmill building. The excavated soils were stockpiled, covered with tarps, and sampled for various contaminants related to former lumber mill activity (for example, wood treating solutions, dioxins, petroleum hydrocarbons, etc.). On November 15, 2017, DTSC staff concluded that the test results for the soil samples from the stockpiles were below the regulatory screening levels for residential uses of such soils. The DTSC stated in a letter (DTSC, 2017), "*Based on the results of the sampling, the stockpiled soils are below the levels DTSC uses for screening soil for unrestricted uses*." The DTSC also stated:

> "*In addition, DTSC is not aware of any residual contamination above unrestricted screening levels at the McNamara & Peepe site except within the capped area identified in the recorded land use covenant (1998-2896-38), a small area of contamination just east of the capped area between the former green chain and the former lumber mill, and in groundwater beneath these areas. Contamination in the uncapped area is not at the surface and is documented in the December 16, 2010 and the February 21, 2012 Technical Memorandums prepared by URS Corporation*."

Based on the sampling results and DTSC determination, the excavated soils were properly disposed of by reusing them in a manner consistent with the determination. This was done through the reuse of the soils as subbase for paved areas onsite.

Regulatory Setting:

Clean Water Act

The Federal Clean Water Act (CWA), enacted by Congress in 1972 and amended several times since, is the primary federal law regulating water quality in the U.S. and forms the basis for several State and local laws throughout the country. The CWA established the basic structure for regulating discharges of pollutants into the waters of the U.S. The CWA gave the EPA the authority to implement federal pollution control programs, such as setting water quality standards for contaminants in surface water, establishing wastewater and effluent discharge limits for various industry categories, and imposing requirements for controlling nonpoint source pollution. At the federal level, the CWA is administered by the EPA and United States Army Corps of Engineers (USACE). At the state and regional levels in California, the Act is administered and enforced by the SWRCB and the nine RWQCBs.

Section 303(d) of the CWA requires state governments to present the EPA with a list of "*impaired water bodies*," defined as "those water bodies that do not meet water quality standards, even after point sources of pollution have been equipped with the minimum required levels of pollution control technology."

Sections 404 and 401 of the CWA require permitting and State certification for construction and/or other work conducted in "waters of the United States." Such work includes levee work, dredging, filling, grading, or any other temporary or permanent modification of wetlands, streams, or other water bodies.

SWRCB/NCRWQCB – Industrial General Permit (IGP)

The Statewide General Permit for Stormwater Discharges Associated with Industrial Activities, Order 2014-0057-DWQ (IGP) implements the federally required stormwater regulations in California for stormwater associated with industrial activities discharging to waters of the United States. The IGP regulates industrial storm water discharges and authorized non-stormwater discharges from industrial facilities. The IGP is called a general permit because many industrial facilities are covered by the same permit but comply with its requirements at their individual industrial facilities. The SWRCB and RWQCBs (collectively, the Water Boards) implement and enforce the IGP. The Royal Gold facility is in Region 1, which is under the jurisdiction of the North Coast RWQCB (SWRCB, 2014).

Pursuant to the Statewide General Permit for Storm Water Discharges Associated with Industrial Activities, businesses in specified SIC codes must implement the IGP. Royal Gold's operations are in SIC Code 2875 (Fertilizers, Mixing Only). This includes mixed potting soil and fertilizers, which is the primary activity at this facility. As such, Royal Gold requires IGP coverage (WDID No. 1 12I025790). Royal Gold complies with the IGP with a SWPPP, which is periodically updated for current operational conditions. Royal Gold's approach to reducing pollutant concentrations in stormwater runoff leaving the site includes the following (SHN, 2021a):

- Personnel stormwater management training
- Site housekeeping and maintenance program
- Site cleanup of historical soil, metal, and trash (much of which was buried or overgrown)

- Installation of innovative best management practices (BMPs) to filter, slow, and reduce stormwater runoff
- Sampling and monitoring to evaluate the effectiveness of BMPs and identify areas for continual stormwater quality improvement

The company samples for stormwater characteristics and constituents including pH, total suspended solids (TSS), oil and grease (O&G), chemical oxygen demand (COD), nitrate + nitrite (nitrogen), total phosphorus, iron, aluminum, zinc, and lead. The primary stormwater pollutant constituents of concern and documented exceedances of the IGP Numeric Action Levels (NALs) at the Royal Gold site are iron, aluminum, nitrate + nitrite (nitrogen), TSS, and COD. According to the stormwater sampling conducted at the Royal Gold site in December 2020 and April 2021, there were documented exceedances of the IGP NALs for iron (4.7 milligrams per liter [mg/L] vs. NAL of 1.0 mg/L) and aluminum (0.795 mg/L vs. NAL of 0.75 mg/L) in the runoff discharging from the site. All other stormwater pollutant constituents of concern were below the NALs, including the constituents with prior documented exceedances (nitrate + nitrite, TSS, and COD).

The IGP requires dischargers to develop and implement Exceedance Response Action (ERA) plans, when an NAL exceedance occurs during a reporting year. The first time an NAL exceedance occurs for any one parameter, a discharger's status is changed from Baseline to Level 1 status, and the discharger is required to evaluate and revise, as necessary, its BMPs (with the assistance of a Qualified Industrial Stormwater Practitioner [QISP]) and submit a report prepared by a QISP. The second time an NAL exceedance occurs for the same parameter in a subsequent reporting year, the discharger's status is changed from Level 1 to Level 2 status, and dischargers are required to submit a Level 2 ERA Action Plan and a Level 2 ERA Technical Report (SWRCB, 2015). In response to past NAL exceedances, Royal Gold has prepared and submitted Level 1 ERA Action Plans and Level 2 ERA Action Plans and Technical Reports (SPC, 2016; SHN, 2017b; SHN, 2018a; SHN, 2018b; SHN, 2019a).

The NAL values in the current IGP (SWRCB, 2014) are primarily derived from the benchmark monitoring thresholds in the 2008 EPA Multi-Sector General Permit (MSGP). Exceedance of an NAL is not a violation of the IGP and NALs are not intended to serve as technology-based or water quality-based numeric effluent limitations, and are not derived directly from either Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) requirements or receiving water objectives. Therefore, NAL exceedances defined in the IGP are not, in and of themselves, violations of the General Permit (SWRCB, 2021b), but they do prompt a change in current best management practices to decrease the exceedance by entering into a Level 1 or Level 2 status. Royal Gold is currently in Level 1 for Aluminum and Level 2 for Iron.

On September 30, 2021, the North Coast RWQCB conducted an inspection of the Royal Gold facility to evaluate existing and proposed BMPs and general compliance with the IGP. As indicated in the conclusion section of the Industrial Stormwater Inspection Review Checklist (RWQCB, 2021a):

> "*Housekeeping practices and source control are implemented as required. Minimum and advanced BMPs installed/implemented at the Facility include: Series of ponds, bioswales, sediment traps, lined ditch, gravel bags, check dams, fiber media socks, floating treatment*

island, metal filtration BMP for Zinc, paving and sweeping. The Discharger utilizes three motorized sweepers and paved areas were clean and free of sediment during the inspection. According to SMARTS no more exceedances have recently occurred for Total Suspended Solids (TSS), Zinc (Zn), Nitrate plus Nitrite (N+N) and Phosphorous. However, the facility is currently in level 2 for Iron (Fe) and level 1 for Aluminum (Al).

Per the Discharger, their County use permit application includes additional minimum and advanced BMPs as follows:

- *Constructing 3 main buildings as storm-resistant shelters*
- *Paving additional areas on the east and northeast corner of the facility*
- *Proposed swale on the northeast side of the facility*
- *Proposed detention basin on the east side of the facility*

Installing these additional BMPs in conjunction with the existing BMPs may result in a significant reduction of pollutant of concerns in the Facility's run-off if the discharger keeps maintaining the BMPs."

Modifications to EPA Multi-Sector General Permit Related to Iron and Aluminum

Stormwater discharges from industrial activities are managed federally by the EPA's MSGP. As discussed above, the Statewide General Permit for Stormwater Discharges Associated with Industrial Activities, Order 2014-0057-DWQ (IGP) implements the federally required stormwater regulations in California for stormwater associated with industrial activities discharging to waters of the United States. As noted above, the NAL values in the current IGP (SWRCB, 2014) are primarily derived from the benchmark monitoring thresholds in the 2008 EPA MSGP.

The MSGP was most recently reissued in January 2021 and replaces the previous 2015 MSGP. In June 2015, after the EPA issued the 2015 MSGP, several parties filed petitions for review of the 2015 permit (2021 MSGP Fact Sheet; EPA, 2021). Subsequent discussions resulted in the August 2016 Settlement Agreement between the EPA and the petitioners (EPA, 2016). The Settlement Agreement did not affect the 2015 MSGP but specified several items that the EPA agreed to address in the proposed 2020 MSGP. Per the Settlement Agreement, the EPA agreed to fund a study conducted by the National Academies of Sciences, Engineering, and Medicine's (NAS) National Research Council (NRC). One of the primary objectives of the committee was to suggest improvements to the MSGP benchmark monitoring requirements (EPA, 2016).

NAS released the study in February 2019 (NAS, 2019). The NAS report details many NRC recommendations on pollutant monitoring requirements and benchmark thresholds. One of the NRC recommendations was: "*Benchmarks should be based on the latest toxicity criteria designed to protect aquatic ecosystems from adverse impacts from short- term or intermittent exposures, which to date have generally been acute criteria.*"

Based on NRC's findings and recommendations, the 2021 MSGP modified a number of benchmark monitoring thresholds from the 2015 MSGP. In particular, the 2021 MSGP:

- Removed the benchmark monitoring threshold for iron based on lack of documented acute toxicity criteria, and
- Raised the aluminum benchmark monitoring threshold from 0.75 mg/L to 1.1 mg/L based on revised current CWA section 304(a) national recommended aquatic life water quality criteria.

Given the lack of an acute criterion, the EPA had previously based the iron benchmark threshold on the 1986 chronic criterion of 1,000 µg/L or 1.0 mg/L (NAS, 2019). The EPA has never before developed national recommended acute aquatic life criteria for iron (NAS, 2019). The NRC study found few studies on the acute effects of iron on aquatic organisms, and the studies that were referenced suggest lethal effects occur well above the 2015 MSGP benchmark over longer time periods (EPA, 2021). Another study cited by the NRC also suggested that iron has relatively low toxicity, and bioaccumulation of iron does not pose a substantial hazard to higher trophic levels; therefore, it is unlikely that a criterion based on intermittent exposure would be necessary (NAS, 2019; EPA, 2021). Based on these findings, the NRC recommended that the EPA no longer require an iron benchmark (EPA, 2021). Consequently, the EPA has removed iron as a benchmark in the 2021 MSGP. If the EPA revises the recommended aquatic life criterion for iron in the future, they may consider including it in a future proposed permit (EPA, 2021).

The 2021 MSGP benchmark threshold for aluminum increased from 750 µg/L to 1,100 µg/L (0.75 mg/L to 1.1 mg/L). The 2015 MSGP benchmark value for aluminum was set to 750 µg/L (0.75 mg/L) based on the 1988 national recommended acute freshwater aquatic life criteria (EPA, 1988), which were not normalized to water quality conditions (EPA, 2021). In 2018, the EPA updated the recommended aluminum criteria to reflect the latest scientific understanding of how water chemistry parameters alter the bioavailability of aluminum and affect toxicity to aquatic species (EPA, 2018a; EPA, 2021). The updated criteria uses a criteria calculator that incorporates total hardness, pH, and dissolved organic carbon. Therefore, rather than setting a single fixed value, the new recommended criteria values vary depending on the water chemistry conditions in the waterbody (EPA, 2018a; EPA, 2021).

Since NRC recommended considering the 2018 aluminum water quality criteria (NAS, 2019), the EPA explored ways to update the MSGP's benchmark threshold given the variable site-specific nature of the new criteria (EPA, 2021). The 2021 MSGP incorporated the revised aluminum criteria in two ways: 1) using a single nationally representative value based on the criteria calculator as the MSGP benchmark threshold (1,100 µg/L or 1.1 mg/L); and 2) providing operators who may exceed this benchmark the opportunity to conduct a site-specific analysis using the 2018 aluminum criteria model to demonstrate that their discharges would not exceed their refined site-specific value (EPA, 2021).

Based on the NAS findings, the removal of the iron benchmark threshold and the revised benchmark threshold value for aluminum (1.1 mg/L) do not compromise surface water quality standards. Findings in the NAS report and subsequent integration of those findings into the 2021 MSGP have rendered the NALs of the 2014 SWRCB IGP as scientifically outdated. Although the 2014 IGP is administratively expired as of June 30, 2020, the SWRCB is not anticipating a reissuance of the IGP until 2023. At a minimum, the reissued IGP will institute NALs that are derived from and function similarly to the benchmark values of the 2021 MSGP. Therefore, in

the next iteration of the IGP, iron is anticipated to be removed and the NAL for aluminum is anticipated to be increased to 1.1 mg/L

Analysis:

a) *Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?*
Less-than-significant with Mitigation Incorporated.

For the purposes of this analysis, potential impacts to water quality are divided into two phases of the project – construction and operation.

Construction
Surface water features at the project site include seasonal wetlands that occur within the northwestern and central portions of the project site and several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site (see Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year [2009] and Figure 15 – Delineated Wetlands). Freshwater emergent wetlands occur along the fringes of the developed project area, in areas that collect water and have not been disturbed since the closure of the mill. An OHWM occurs within the drainageway along the northwestern border of the project area, within an excavated channel. The drainage meets the characteristics of a channelized second-order stream (SHN, 2018c).

Other onsite drainage features include man-made stormwater features constructed during past industrial use of the property such as drainage ditches, detention basins, drainage inlets, culverts, and stormwater piping. As discussed in the Setting, Royal Gold has improved and maintained the existing stormwater infrastructure at the site and added a variety of additional stormwater features (see Figure 13 – SWPPP BMP Location Map). Stormwater discharge from the western portion of the project site flows to the southwest into roadside drainage ditches along Glendale Drive that discharge to the Mad River. Stormwater discharges from the central and eastern portions of the site flow to the south through a series of stormwater drainage ditches and culverts on adjacent private property, which discharge into Hall Creek and ultimately the Mad River (see Figure 23 – Drainage Connectivity Map). Stormwater discharge from the northwestern corner of the facility flows to the north through a bioswale into a vegetated buffer.

Wetland Mitigation:
As discussed in the Setting, numerous stormwater improvements (now subject to after-the-fact approval) have been constructed throughout the site to comply with the requirements of the SWRCB IGP and the settlement agreement with Humboldt Baykeeper. These improvements are identified in the current SWPPP for the facility (see Appendix 5.9; SHN, 2021c) and Figure 13 – SWPPP BMP Location Map. As discussed in the Wetland Mitigation and Monitoring Plan Addendum 1 (SHN, 2020) prepared for the Royal Gold facility, approximately 0.83 acres (36,155 square feet) of Clean Water Act "jurisdictional wetlands" have been impacted at the site by Royal Gold (see Figure 17 – Impacted Areas). Most of these former wetlands (0.73 acres or 31,799 square feet) were located in the central portion of the site and were converted into stormwater detention basins. The remainder of these

wetlands (0.10 acres or 4,356 square feet) were filled for use as paving, parking, storage, and coco processing.

Construction of additional stormwater management areas is proposed on the central eastern portion of the site that will convert wetlands into stormwater detention basins. These additional stormwater improvements are necessary to manage the additional stormwater runoff from the new impervious surfaces proposed in the northern eastern portion of the site (for example, Building D and additional paving). Portions of the wetlands in the central eastern portion of the site will also be filled and developed as paving, storage areas, stormwater swales, and earthen berms. As discussed in the Wetland Mitigation and Monitoring Plan Addendum 1 (SHN, 2020), approximately 0.74 acres (32,234 square feet) of jurisdictional wetlands would be impacted at the site by these proposed improvements.

Construction of a wetland mitigation area is proposed in the northwestern portion of the site (Assessor's Parcel Numbers [APNs] 516-101-040, -064, and -068) to mitigate for existing and proposed impacts to wetlands at the site (see Figure 18 – Mitigation Area Map). As discussed in the Wetland Mitigation and Monitoring Plan Addendum 1 (SHN, 2020), these impacts would be mitigated at a 2:1 ratio, resulting in approximately 3.17 acres (138,520 square feet) of three-parameter wetlands. Because the existing/proposed wetland impacts and the proposed construction of the wetland mitigation area will impact federal, state, and local agency jurisdictional areas, the following permits will be required: 1) CWA Section 404 Permit from the USACE; 2) Section 401 Water Quality Certification from the North Coast RWQCB; 3) LSA Agreement from the California Department of Fish and Wildlife (CDFW); and 4) Special Permit from the County of Humboldt. These permits will be conditioned with control measures and protocols to minimize the degradation of surface water and groundwater quality during proposed construction activities.

Stormwater:
Proposed construction activities will require the placement of fill, grading, trenching, operation of heavy equipment, and the storage and use of construction materials. During construction, soil particulate has the potential to become entrained in stormwater, resulting in turbidity and the discharge of sediment from the project site. In addition, stormwater discharge may include debris, chemicals, paints, solvents, and petroleum hydrocarbons as a result of improper storage of construction materials, improper disposal of construction wastes, discharges resulting from construction dewatering activities, and spilled petroleum products. As such, short-term water quality impacts have the potential to occur during construction of the proposed project in the absence of any protective and avoidance measures.

The proposed construction activities would be subject to the requirements of the Humboldt County Grading, Excavation, Erosion, and Sedimentation Control Ordinance (Section 331-12), which sets forth rules and regulations to control excavation, grading and earthwork construction, including fills and embankments and erosion and sedimentation controls. In addition to providing a plan that identifies the location of the work, applications for grading permits shall also include a site-specific erosion and sediment control plan. The ordinance contains a list of minimum requirements for erosion and sedimentation control. Grading activities are also required to conform to grading standards, including for cut slope, fill material, setbacks, terracing, and drainage. If applicable, the proposed improvements may

require obtaining a SWRCB Construction General Permit, which requires the development of a construction-specific SWPPP (SWRCB, 2021c). In some cases, a SWPPP may be submitted to the county in lieu of the erosion and sediment control plan required by the grading ordinance. Adherence to existing county and state grading and erosion control regulations would prevent the discharge of sediment during the proposed construction activities. Additionally, with appropriate storage, handling, and disposal practices in compliance with applicable federal, State, and local regulations, there is relatively little potential for the discharge of debris, petroleum hydrocarbons, etc. into nearby surface waters during construction. As such, compliance with existing regulations and permitting requirements will minimize the risk of water quality impacts during construction of the proposed project.

Hazardous Materials:
As discussed in the Setting and in Section 3.2.9 - Hazards and Hazardous Materials, there is legacy contamination at the project site from when the site was historically used for lumber mill operations. Contaminants have been found in soil, groundwater, and surface water samples collected from the former McNamara & Peepe (M&P) lumber mill, which was historically located on a portion of the Royal Gold site (see Figure 21 – Soil and Groundwater Management Plan and Appendix 5.8; SHN, 2021d).

The proposed site improvements have the potential to result in ground disturbance that could uncover unknown areas of contamination at the site and potentially create a significant hazard to the public or the environment. For this reason, a Soil and Groundwater Management Plan (SGMP) has been prepared (see Appendix 5.8; SHN, 2021d) and its implementation for future ground-disturbing activities at the site is incorporated as Mitigation Measure HHM-1. The SGMP addresses recommendations for characterization of soil and groundwater impacted by potential site contaminants (PSCs) prior to proposed construction activities for worker safety, potential onsite reuse or offsite disposal, and management of excavated material at the property. The SGMP provides recommended guidance to protect site construction workers, the public, and the environment from PSCs in soil and/or groundwater encountered during site activities. The SGMP includes recommended actions to address handling, onsite reuse, and offsite disposal of contaminated soil and/or groundwater, if necessary. The objective of the SGMP is to ensure that no significant impacts occur to nearby sensitive receptors, aquatic species, and water resources. The SGMP will be provided to and used by Royal Gold staff, and training will be provided regarding adherence to its recommendations. The SGMP shall also be provided to contractors prior to conducting work at the site involving ground disturbance.

Conclusion:
The construction activities proposed by the project, as mitigated and in compliance with permit conditions and regulatory requirements, would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.

Operation
Project operations have the potential to result in water quality pollutants such as lubricants, gasoline and diesel, hydraulic oil, grease and motor oil, nitrates and other nutrients, metals,

increased COD, and TSS (see Appendix 5.9; SHN, 2021c). The release of such pollutants would adversely affect water quality. As such, water quality impacts have the potential to occur during operation of the proposed project in the absence of any protective and avoidance measures.

Stormwater:
The Royal Gold operation is subject to the authority of the SWRCB. Pursuant to the Statewide General Permit for Storm Water Discharges Associated with Industrial Activities (IGP; SWRCB Order 2014-0057-DWQ as amended in 2015 and 2018) (SWRCB, 2021b), businesses in specified SIC codes must implement the IGP. Royal Gold's operations are in SIC Code 2875 Fertilizers, Mixing Only. This includes mixed potting soil and fertilizers, which is the primary activity at this facility. Royal Gold obtained IGP coverage in August 2015 and was subsequently assigned WDID No. 1 12I025790 by the SWRCB. Royal Gold complies with the IGP with a SWPPP, which is periodically updated for current operational conditions. Royal Gold's approach to reducing pollutant concentrations in stormwater runoff leaving the site includes the following (see Appendix 5.9; SHN, 2021c):

- Personnel stormwater management training
- Site housekeeping and maintenance program
- Site cleanup of historical soil, metal, and trash (much of which was buried or overgrown)
- Installation of innovative BMPs to filter, slow, and reduce stormwater runoff
- Sampling and monitoring to evaluate the effectiveness of BMPs and identifying areas for continual stormwater quality improvement

The company samples for stormwater characteristics and constituents including pH, TSS, O&G, COD, nitrate + nitrite (nitrogen), total phosphorus, iron, aluminum, zinc, and lead. The primary stormwater pollutant constituents of concern and historically documented exceedances of the IGP NALs at the Royal Gold site are iron, aluminum, nitrate + nitrite (nitrogen), TSS, and COD.

As discussed previously in Section 2.2.3, Humboldt Baykeeper filed a CWA lawsuit against Royal Gold in 2016, which resulted in a settlement agreement that expired in 2019. Per the settlement agreement, a number of stormwater improvements were constructed at the site including installing additional paving. Royal Gold continues to construct stormwater improvements throughout the site for improved stormwater management facilities and practices and to comply with the requirements of the SWRCB IGP. Several of these improvements included upgrades to the stormwater infrastructure at the site that was installed by others during past industrial use. As discussed elsewhere in this document, these improvements include the conversion of the southern central wetland area at the site into stormwater detention basins, with the offsetting wetland mitigation area. Existing stormwater management features at the project site are identified in the current SWPPP (see Appendix 5.9; SHN, 2021c) and include, but are not limited to, detention basins, bioswales, lined ditches, floating treatment islands, sediment traps, gravel bags, check dams, fiber media socks, drainage ditches, drainage inlets, culverts, and stormwater piping. See Figure 13 – SWPPP BMP Location Map, which shows the existing stormwater management features at

the site and the ten locations of stormwater discharge from the site. Additionally, Royal Gold has constructed several buildings which now cover materials storage and processing areas such as, Building A, Building B, and the addition to the amendment storage building. These stormwater management improvements have resulted in significant reductions in the pollutant concentrations detected in stormwater discharging from the facility and have improved stormwater quality leaving the site.

Stormwater sampling data from December 2016 to April 2021 shows a general trend of pollutant reduction across the site (see Table 8). TSS and COD have not exceeded the NALs since December 2016. Nitrate peaked at 4.08 mg/L in December 2016 and last exceeded the NAL in March 2019. Iron and aluminum were trending downwards until the December 2020 and April 2021 NAL exceedances. In December 2020 and April 2021, iron concentrations were detected at 2.1 mg/L and 4.7 mg/L, respectively, versus an NAL of 1.0 mg/L. In December 2020, aluminum concentrations were detected at 0.795 mg/L versus an NAL of 0.75 mg/L.

Table 8: SMARTS[1] Stormwater Sampling Results – Site Averages

Sample Date	Nitrate[2] (mg/L)	Nitrite[2] (mg/L)	TSS[2] (mg/L)	COD[2] (mg/L)	Total P[2] (mg/L)	O&G[2] (mg/L)	Alum-inum[2] (mg/L)	Iron[2] (mg/L)	Lead[2] (µg/L)	Zinc[2] (µg/L)
Limits (NALs)	0.68		100	120	2	15	0.75	1	0.262	0.26
12/23/16	**4.082**	0.000	**173.67**	**125.12**	0.760	3.967		**10.883**	0.005	0.068
4/7/17	0.663	0.013	96.286	60.286	0.363	2.886	**6.186**	**9.700**	0.002	0.100
11/28/17	**0.928**	0.000	30.733	47.500	0.248	0.000		**3.867**	0.000	0.090
1/16/18	0.572	0.000	12.783	37.533	0.240	0.000		**2.253**	0.000	0.099
5/25/18	**0.713**	0.000	12.760	31.400	0.145	0.280		**1.292**	0.000	0.128
12/10/18	**2.185**	0.000	8.871	34.571	0.192	0.000		**1.176**	0.001	0.072
12/24/18	0.482	0.000	11.371	16.014	0.148	0.000		0.704	0.000	0.096
2/4/19	0.474	0.000	13.800	12.050	0.116	0.000		**1.883**	0.001	0.085
3/20/19	**1.250**	0.528	11.160	38.300	0.184	0.000		0.827	0.001	0.118
11/19/19	0.462	0.005	12.111	36.444	0.212	0.000	**0.771**	0.891	0.000	0.087
12/19/19	0.259	0.000	11.375	26.375	0.208	0.000	0.670	0.861	0.000	0.064

Sample Date	Nitrate[2] (mg/L)	Nitrite[2] (mg/L)	TSS[2] (mg/L)	COD[2] (mg/L)	Total P[2] (mg/L)	O&G[2] (mg/L)	Alum-inum[2] (mg/L)	Iron[2] (mg/L)	Lead[2] (µg/L)	Zinc[2] (µg/L)
1/24/20	0.236	0.000	5.629	22.143	0.070	0.000	0.404	0.863	0.000	0.129
12/22/20	0.338	0.019	17.000	42.250	0.115	0.000	**0.795**	**2.095**	0.000	0.026
4/26/21	0.178	0.017	11.629	41.714	0.186	0.000		**4.727**	0.000	0.068
1: SMARTS: Stormwater Multiple Applications and Report Tracking System 2: Numbers in bold represent exceedances of the applicable limit – Numeric Action Level (NAL).										

As discussed in the Setting, the exceedance of an NAL is not a violation of the SWRCB IGP; NALs are not intended to serve as technology-based or water quality-based numeric effluent limitations and are not derived directly from either Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) requirements or receiving water objectives. Therefore, NAL exceedances defined in the IGP are not, in and of themselves, violations of the IGP (SWRCB, 2021b). But they do prompt a change in current BMPs to decrease the exceedance by entering into a Level 1 or Level 2 status. Additionally, NALs are not a California Environmental Quality Act (CEQA) threshold that has been adopted by the SWRCB. For this reason, they are not used as a CEQA threshold for the purposes of this analysis.

The IGP requires dischargers to develop and implement ERA plans, when an NAL exceedance occurs during a reporting year. The first time an NAL exceedance occurs for any one parameter, a discharger's status is changed from Baseline to Level 1 status, and the discharger is required to evaluate and revise, as necessary, its BMPs (with the assistance of a QISP) and submit a report prepared by a QISP. The second time an NAL exceedance occurs for the same parameter in a subsequent reporting year, the discharger's status is changed from Level 1 to Level 2 status, and dischargers are required to submit a Level 2 ERA Action Plan and a Level 2 ERA Technical Report (SWRCB, 2015). In response to past NAL exceedances, Royal Gold has prepared and submitted Level 1 ERA Plans and Level 2 ERA Plans and Technical Reports (SPC, 2016; SHN, 2017b; SHN, 2018a; SHN, 2018b; SHN, 2019a).

As discussed in the Setting, the IGP implements the federally required stormwater regulations in California for stormwater associated with industrial activities discharging to waters of the United States. Like iterations before it, the 2014 SWRCB IGP is based on the EPA MSGP that was current at the time of its adoption. Consequently, the NAL values in the current IGP (SWRCB, 2014) are primarily derived from the benchmark monitoring thresholds in the 2008 EPA MSGP. As discussed in the Setting, the MSGP was recently reissued in January 2021, which included modifications to the benchmark monitoring thresholds for iron and aluminum. These modifications included, but are not limited to, the following:

- Removal of the benchmark monitoring threshold for iron based on a lack of acute toxicity criteria, and

- Increase of the aluminum benchmark monitoring threshold from 0.75 mg/L to 1.1 mg/L, based on current CWA Section 304(a) national recommended aquatic life water quality criteria.

The 2021 MSGP changes to the iron and aluminum benchmark thresholds are particularly important to the Royal Gold facility as Royal Gold is required to analyze their stormwater samples for both of these parameters. Additionally, Royal Gold had exceedances of the IGP NALs for iron and aluminum in their most recent sampling events. As discussed in the Setting, based on the findings of a study prepared by the NAS in 2019, the removal of the iron benchmark threshold and the revised benchmark threshold value for aluminum (1.1 mg/L), do not compromise surface water quality standards. Findings in the NAS report and subsequent integration of those findings into the 2021 MSGP have rendered the NALs of the 2014 SWRCB IGP as scientifically outdated. Although the 2014 IGP is administratively expired as of June 30, 2020, the SWRCB is not anticipating a reissuance of the IGP until 2023. At a minimum, the reissued IGP will institute NALs that are derived from and function similarly to the benchmark values of the 2021 MSGP. As such, in the next iteration of the IGP, iron is anticipated to be removed and the NAL for aluminum is anticipated to be increased to 1.1 mg/L. Therefore, annual average iron and aluminum concentrations discharging from the Royal Gold facility would not be considered to result in exceedances of water quality standards.

Based on a review of the recent IGP NAL exceedances by Royal Gold staff in preparation for submittal of the ERA Plans to the SWRCB, it was determined that the specific source of the iron and aluminum exceedances was likely a combination of the following: 1) lack of sediment removal from the onsite detention basins; and 2) the build-up of aquatic vegetation that, when not removed annually, releases metals back into the basin environment when it dies. Other sources of iron from around the site were determined to include degraded graveled areas that are proposed to be paved in the northeastern portion of the facility (see Figure 6 – Site Plan).

As previously discussed under Section 3.2.4 – Biological Resources, Mitigation Measure BR-5 has been incorporated for the project to minimize discharges of iron and aluminum from the site, although it is not required because no significant impact has been identified. Mitigation Measure BR-5 establishes a required set of protocols for annual maintenance of existing and proposed stormwater detention basins, addressing draining, sediment removal, and vegetation removal practices. It is anticipated that the implementation of Mitigation Measure BR-5 and paving the additional areas in the northeastern portion of the site, will bring average discharges of iron and aluminum back below the NALs for the 2021-22 water year.

Lastly, on September 30, 2021, the North Coast RWQCB conducted an inspection of the Royal Gold facility to evaluate existing and proposed BMPs and general compliance with the IGP. As indicated in the conclusion section of the Industrial Stormwater Inspection Review Checklist (RWQCB, 2021a):

> "*Housekeeping practices and source control are implemented as required. Minimum and advanced BMPs installed/implemented at the Facility include: Series of ponds,*

bioswales, sediment traps, lined ditch, gravel bags, check dams, fiber media socks, floating treatment island, metal filtration BMP for Zinc, paving and sweeping. The Discharger utilizes three motorized sweepers and paved areas were clean and free of sediment during the inspection. According to SMARTS no more exceedances have recently occurred for Total Suspended Solids (TSS), Zinc (Zn), Nitrate plus Nitrite (N+N) and Phosphorous. However, the facility is currently in level 2 for Iron (Fe) and level 1 for Aluminum (Al).

Per the Discharger, their County use permit application includes additional minimum and advanced BMPs as follows:

- *Constructing 3 main buildings as storm-resistant shelters*
- *Paving additional areas on the east and northeast corner of the facility*
- *Proposed swale on the northeast side of the facility*
- *Proposed detention basin on the east side of the facility*

Installing these additional BMPs in conjunction with the existing BMPs may result in a significant reduction of pollutant of concerns in the Facility's run-off if the discharger keeps maintaining the BMPs."

Therefore, the proposed project as designed, mitigated, and with continued compliance with the SWRCB IGP requirements, would prevent significant water quality impacts from project operation.

Wastewater:
Wastewater collection is provided to the project site by the FGCSD who contracts with the City of Arcata for sanitary sewer treatment and disposal. The FGCSD designates the company as a Significant Industrial User and has issued Royal Gold a Wastewater Discharge Permit (#2020-01) authorizing discharges of industrial wastewater (FGCSD, 2020). The Permit has discharge standards, flow limitations, and monitoring, sampling, and reporting requirements. Wastewater being discharged to the sewers is primarily runoff from coco fiber hydration with a minimal contribution from existing bathroom facilities at the site. The industrial wastewater is stored in tanks to lower the discharge rate and allow wastewater to be discharged continuously, seven days per week instead of only when the process water is running off from the coco hydration system. Onsite pretreatment of industrial wastewater involves the use of collection tanks which act as passive sediment traps as well as removal of sediment from the effluent through a vibratory separator. Other than the outflow from the coco hydration, the only other connections to the sewer are two toilets and two sinks (FGCSD, 2020).

The project proposes to add bathroom facilities in proposed Building F, which would result in additional domestic type wastewater. All bathroom facilities would be connected to the FGCSD wastewater collection system and subject to the requirements of the facilities Wastewater Discharge Permit and any applicable pretreatment regulations (for example, 40 CFR 403 and FGCSD Ordinance No. 90-2). The increase in wastewater discharge from the proposed bathrooms would be minimal relative to the maximum daily flow rate of process

wastewater that is currently allowed for the facility. In compliance with the requirements of the Wastewater Discharge Permit (#2020-01) and other applicable laws and regulations, the proposed project would not adversely affect the City's wastewater treatment facility nor result in associated water quality impacts.

Conclusion
Therefore, compliance with existing regulatory requirements (Humboldt County Grading Ordinance, SWRCB CGP, SWRCB IGP, and FGCSD Wastewater Discharge Permit), permit conditions from the USACE, North Coast RWQCB, and CDFW, and implementation of Mitigation Measures HHM-1 and BR-5, will ensure the proposed project will not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality during construction or operation. Based on the above, impacts from the proposed project would be less than significant with mitigation incorporated on this category of environmental effect.

a) *Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?*
Less-than-significant Impact.

Water is supplied to the project site by FGCSD. FGCSD buys water from the HBMWD, which is piped from its original source – subsurface wells on the Mad River upstream from the City of Arcata. The HBMWD water is obtained from horizontal collection chambers buried approximately 100 feet below the bed of the Mad River between Blue Lake and Arcata. The HBMWD has appropriative water rights from the SWRCB through the year 2029 for surface water storage and diversion (City of Arcata, 2018). No groundwater is used or proposed to be used by the Royal Gold operation.

Therefore, the proposed project will not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

c) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:*

i) *Result in substantial erosion or siltation on- or off-site?*
Less-than-significant Impact.

As discussed in the Setting and subsection a), surface water features at the project site include seasonal wetlands that occur within the northwestern and central portions of the project site and several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site (see Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year [2009] and Figure 15 – Delineated Wetlands). An OHWM occurs within the drainageway along the northwestern border of the project area, within an excavated channel. The drainage meets the characteristics of a channelized second-order stream (SHN, 2018c).

Other onsite drainage features include man-made stormwater features constructed during past industrial use of the property such as drainage ditches, detention basins, drainage inlets, culverts, and stormwater piping. As discussed in the Setting, Royal Gold has improved and maintained the existing stormwater infrastructure at the site and added a variety of additional stormwater features (see Figure 13 – SWPPP BMP Location Map). Stormwater discharge from the western portion of the project site flows to the southwest into roadside drainage ditches along Glendale Drive that discharge to the Mad River. Stormwater discharges from the central and eastern portions of the site flow to the south through a series of stormwater drainage ditches and culverts on adjacent private property, which discharge into Hall Creek and ultimately the Mad River (see Figure 23 – Drainage Connectivity Map). Stormwater discharge from the northwestern corner of the facility flows to the north through a bioswale into a vegetated buffer.

Wetland Mitigation:
The project does not propose the alteration of the course of a stream or river. However, as part of construction of the wetland mitigation area, it is proposed to enlarge the opening in the constructed berm along the southern edge of the drainage in the northwestern portion of the site. There is currently an approximate 3-foot-wide opening in the constructed berm along the southern edge of the drainage, which allows water to temporarily spread out into the existing wetland areas and proposed wetland mitigation area during higher flows. The opening in the berm is proposed to be widened to approximately 5-8 feet to allow additional water to temporarily flow into the wetland mitigation area during higher flow events. This proposed design feature is intended to increase the likelihood of success of the proposed mitigation wetland. The enlarged opening would be designed with appropriate erosion control features (for example, rock slope protection, etc.) to prevent substantial erosion or siltation within the drainage, existing wetlands, and proposed wetland mitigation area. Because the proposed construction of the wetland mitigation area will impact federal, state, and local agency jurisdictional areas, the following permits will be required: 1) CWA Section 404 Permit from the USACE; 2) Section 401 Water Quality Certification from the North Coast RWQCB; 3) LSA Agreement from the CDFW; and 4) Special Permit from the County of Humboldt. These permits will be conditioned to require erosion control design features to minimize the potential for erosion and siltation after construction of the proposed mitigation wetland.

Impervious Surface:
The project has increased the impervious surface area at the project site by constructing several new structures (Building A, Building B, addition to amendment storage building) and paving additional areas to improve site access and stormwater management, minimize fugitive dust, and address concerns about disturbing onsite soils. Some of these paving activities were completed as part of the settlement agreement with Humboldt Baykeeper. As additional impervious surfaces have been installed at the site, Royal Gold has constructed numerous stormwater improvements to manage the increase in runoff and comply with the requirements of the SWRCB IGP and the settlement agreement with Humboldt Baykeeper. Several of these improvements included upgrades to the

stormwater infrastructure at the site that was installed by others during past industrial use. As discussed elsewhere in this document, these improvements also include the conversion of the southern central wetland area at the site into stormwater detention basins. Existing stormwater management features at the project site are identified in the current SWPPP (see Appendix 5.9; SHN, 2021c) and include, but are not limited to, detention basins, bioswales, lined ditches, floating treatment islands, sediment traps, gravel bags, check dams, fiber media socks, drainage ditches, drainage inlets, culverts, and stormwater piping. See Figure 13 – SWPPP BMP Location Map, which shows the existing stormwater management features at the site and the ten locations of stormwater discharge from the site. The existing stormwater management improvements at the project site adequately manage stormwater runoff and minimize the potential for erosion and siltation on- or offsite.

The project proposes to construct several additional structures (Building C, Building D, Building E, Building F or addition to existing building, and fueling station) and pave additional areas in the northern portion of the site (see Figure 6 – Site Plan). These improvements will further increase the impervious surface area at the site, which has the potential to increase the rate and amount of stormwater runoff and result in erosion and discharge of sediment to nearby drainage features. Royal Gold proposes to construct additional stormwater improvements at the site (for example, detention basins, bioswales, etc.) to manage the increased stormwater runoff from the additional impervious surfaces. These additional stormwater features will be incorporated into the facilities SWPPP and the effectiveness of these features will be monitored through the SWRCB IGP. The stormwater improvements will be designed to reduce the volume and rate of runoff, provide for greater infiltration, evaporation, and runoff quality treatment. As such it is not anticipated that the proposed improvements to the Royal Gold facility will result in significant impacts from erosion or siltation.

Conclusion:
The proposed project as designed and in compliance with the requirements of the SWRCB, USACE, North Coast RWQCB, and CDFW, would not result in substantial erosion or siltation on- or offsite. Therefore, impacts from the proposed project would be less than significant on this category of environmental effect.

ii) *Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?*
Less-than-significant Impact.

As discussed in the Setting and subsection a), surface water features at the project site include seasonal wetlands that occur within the northwestern and central portions of the project site and several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site (see Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year [2009] and Figure 15 – Delineated Wetlands). An OHWM occurs within the drainageway along the northwestern border of the project area, within an excavated channel. The drainage meets the characteristics of a channelized second-order stream (SHN, 2018c).

Other onsite drainage features include man-made stormwater features constructed during past industrial use of the property such as drainage ditches, detention basins, drainage inlets, culverts, and stormwater piping. As discussed in the Setting, Royal Gold has improved and maintained the existing stormwater infrastructure at the site and added a variety of additional stormwater features. Stormwater discharge from the western portion of the project site flows to the southwest into roadside drainage ditches along Glendale Drive that discharge to the Mad River. Stormwater discharges from the central and eastern portions of the site flow to the south through a series of stormwater drainage ditches and culverts on adjacent private property, which discharge into Hall Creek and ultimately the Mad River (see Figure 23 – Drainage Connectivity Map). Stormwater discharge from the northwestern corner of the facility flows to the north through a bioswale into a vegetated buffer.

Wetland Mitigation:
The project does not propose the alteration of the course of a stream or river. However, as part of construction of the wetland mitigation area, it is proposed to enlarge the opening in the constructed berm along the southern edge of the drainage in the northwestern portion of the site. There is currently an approximate 3-foot-wide opening in the constructed berm along the southern edge of the drainage, which allows water to temporarily spread out into the existing wetland areas and proposed wetland mitigation area during higher flows. The opening in the berm is proposed to be widened to approximately 5-8 feet to allow additional water to temporarily flow into the wetland mitigation area during higher flow events. This proposed design feature is intended to increase the likelihood of success of the proposed mitigation wetland. The proposed wetland mitigation area will require the excavation and removal of a significant amount of fill from the area adjacent to the drainage, which has the potential to provide additional off-channel storage during flood events. This additional off-channel storage has the potential to minimize any existing downstream flooding issues during peak storm events. As such, it is not anticipated that the proposed modification to the berm along the northwestern drainage will result in significant flooding impacts.

Impervious Surface:
The project has increased the impervious surface area at the project site by constructing several new structures (Building A, Building B, and addition to amendment storage building) and paving additional areas to improve site access and stormwater management, minimize fugitive dust, and address concerns about disturbing onsite soils. Some of these paving activities were completed as part of the settlement agreement with Humboldt Baykeeper. As additional impervious surfaces have been installed at the site, Royal Gold has constructed numerous stormwater improvements to manage the increase in runoff and comply with the requirements of the SWRCB IGP and the settlement agreement with Humboldt Baykeeper. Several of these improvements included upgrades to the stormwater infrastructure at the site that were installed by others during past industrial use. As discussed elsewhere in this document, these improvements also include the conversion of the southern central wetland area at the site into stormwater detention basins. Existing stormwater management features at the project site are identified in the current SWPPP (see Appendix 5.9; SHN, 2021c) and include, but are not limited to,

detention basins, bioswales, lined ditches, floating treatment islands, sediment traps, gravel bags, check dams, fiber media socks, drainage ditches, drainage inlets, culverts, and stormwater piping. See Figure 13 – SWPPP BMP Location Map, which shows the existing stormwater management features at the site and the ten locations of stormwater discharge from the site. The existing stormwater management improvements at the project site adequately manage stormwater runoff and minimize the potential for flooding on- or offsite.

The project proposes to construct several additional structures (Building C, Building D, Building E, Building F or addition to existing building, and fueling station) and pave additional areas in the northern portion of the site (see Figure 6 – Site Plan). These improvements will increase the impervious surface area at the site, which has the potential to increase the rate and amount of stormwater runoff and result in flooding on- or offsite. During operation of the proposed project, increased volume and speed of runoff could cause runoff to reach downstream areas sooner and coincide more closely with the peak of runoff from lower areas; the effect, along with that of higher runoff, could be increased flood flows. Royal Gold proposes to construct additional stormwater improvements at the site (for example, detention basins, bioswales, etc.) to manage the increased stormwater runoff from the additional impervious surfaces. These additional stormwater features will be incorporated into the facilities SWPPP and the effectiveness of these features will be monitored through the SWRCB IGP. The stormwater improvements will be designed to reduce the volume and rate of runoff, provide for greater infiltration, evaporation, and runoff quality treatment. As such it is not anticipated that the proposed improvements to the Royal Gold facility will result in significant flooding impacts.

Conclusion:
The proposed project as designed and in compliance with the requirements of the SWRCB IGP, would not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite. Therefore, impacts from the proposed project would be less than significant on this category of environmental effect.

iii) *Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?*
Less-than-significant Impact.

As discussed in the Setting and subsection a), surface water features at the project site include seasonal wetlands that occur within the northwestern and central portions of the project site and several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site (see Figure 11 – Drainages/Wetlands and SMA Boundary in Baseline Year [2009] and Figure 15 – Delineated Wetlands). An OHWM occurs within the drainageway along the northwestern border of the project area, within an excavated channel. The drainage meets the characteristics of a channelized second-order stream (SHN, 2018c).

Other onsite drainage features include man-made stormwater features constructed during past industrial use of the property such as drainage ditches, detention basins, drainage inlets, culverts, and stormwater piping. As discussed in the Setting, Royal Gold has improved and maintained the existing stormwater infrastructure at the site and added a variety of additional stormwater features. Stormwater discharge from the western portion of the project site flows to the southwest into roadside drainage ditches along Glendale Drive that discharge to the Mad River. Stormwater discharges from the central and eastern portions of the site flow to the south through a series of stormwater drainage ditches and culverts on adjacent private property, which discharge into Hall Creek and ultimately the Mad River (see Figure 23 – Drainage Connectivity Map). Stormwater discharge from the northwestern corner of the facility flows to the north through a bioswale into a vegetated buffer.

Wetland Mitigation:

The project does not propose the alteration of the course of a stream or river. However, as part of construction of the wetland mitigation area, it is proposed to enlarge the opening in the constructed berm along the southern edge of the drainage in the northwestern portion of the site. There is currently an approximate 3-foot-wide opening in the constructed berm along the southern edge of the drainage, which allows water to temporarily spread out into the existing wetland areas and proposed wetland mitigation area during higher flows. The opening in the berm is proposed to be widened to approximately 5-8 feet to allow additional water to temporarily flow into the wetland mitigation area during higher flow events. This proposed design feature is intended to increase the likelihood of success of the proposed mitigation wetland.

The proposed wetland mitigation area will require the excavation and removal of a significant amount of fill from the area adjacent to the drainage, which has the potential to provide additional off-channel storage during flood events. This additional off-channel storage has the potential to minimize any existing downstream flooding issues during peak storm events. Based on the location, design, and purpose of the mitigation wetland, it is not anticipated that the proposed modification to the berm along the northwestern drainage would create or contribute runoff that would exceed the capacity of existing or planned stormwater drainage systems. The enlarged opening in the berm would be designed with appropriate erosion control features (for example, rock slope protection, etc.) to prevent substantial erosion or siltation within the drainage, existing wetlands, and proposed wetland mitigation area. Because the proposed construction of the wetland mitigation area will impact federal, state, and local agency jurisdictional areas, the following permits will be required: 1) CWA Section 404 Permit from the USACE; 2) Section 401 Water Quality Certification from the North Coast RWQCB; 3) LSA Agreement from the CDFW; and 4) Special Permit from the County of Humboldt. These permits will be conditioned to require erosion control design features to minimize the potential for erosion and siltation after construction of the proposed mitigation wetland. Additionally, as indicated on Figure 6 – Site Plan, there is a berm that separates the industrial activity areas at the Royal Gold site from the proposed wetland mitigation area. This separation would prevent other sources of polluted runoff from entering the wetland

mitigation area and the existing drainage/wetland complex in the northwestern portion of the site.

Impervious Surface:
The project has increased the impervious surface area at the project site by constructing several new structures (Building A, Building B, and addition to amendment storage building) and paving additional areas to improve site access and stormwater management, minimize fugitive dust, and address concerns about disturbing onsite soils. Some of these paving activities were completed as part of the settlement agreement with Humboldt Baykeeper. As additional impervious surfaces have been installed at the site, Royal Gold has constructed numerous stormwater improvements to manage the increase in runoff and comply with the requirements of the SWRCB IGP and the settlement agreement with Humboldt Baykeeper. Several of these improvements included upgrades to the stormwater infrastructure at the site that was installed by others during past industrial use. As discussed elsewhere in this document, these improvements also include the conversion of the southern central wetland area at the site into stormwater detention basins. Existing stormwater management features at the project site are identified in the current SWPPP (see Appendix 5.9; SHN, 2021c) and include, but are not limited to, detention basins, bioswales, lined ditches, floating treatment islands, sediment traps, gravel bags, check dams, fiber media socks, drainage ditches, drainage inlets, culverts, and stormwater piping. See Figure 13 – SWPPP BMP Location Map, which shows the existing stormwater management features at the site and the ten locations of stormwater discharge from the site. The existing stormwater management improvements at the project site adequately manage stormwater runoff and prevent substantial sources of polluted runoff from discharging from the site.

The project proposes to construct several additional structures (Building C, Building D, Building E, Building F or addition to existing building, and fueling station) and pave additional areas in the northern portion of the site (see Figure 6 – Site Plan). These improvements will increase the impervious surface area at the site, which has the potential to increase the rate and amount of stormwater runoff and exceed the capacity of existing stormwater drainage system or provide additional sources of polluted runoff. Royal Gold proposes to construct additional stormwater improvements at the site (for example, detention basins, bioswales, etc.) to manage the increased stormwater runoff from the additional impervious surfaces. These additional stormwater features will be incorporated into the facilities SWPPP and the effectiveness of these features will be monitored through the SWRCB IGP. The stormwater improvements will be designed to reduce the volume and rate of runoff, provide for greater infiltration, evaporation, and runoff quality treatment. As such it is not anticipated that the proposed improvements to the Royal Gold facility will exceed the capacity of the existing and planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

Conclusion:
The proposed project as designed and in compliance with the requirements of the SWRCB, USACE, North Coast RWQCB, and CDFW, would not create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage

systems or provide substantial additional sources of polluted runoff. Therefore, the proposed project would result in a less than significant impact on this category of environmental effect.

iv) *Impede or redirect flood flows?*
Less-than-significant Impact.

According to FEMA, Flood Insurance Rate Map (FIRM) Panel No. 06023C0694F, the project site is located outside of a regulated flood hazard zone (FEMA, 2016). According to the inundation mapping approved by the California Department of Water Resources Division of Safety of Dams, the project site is outside of the area that would be subject to flooding or inundation from failure of the R.W. Matthews Dam at the Ruth Reservoir (CDWR, 2021).

Under the environmental baseline condition, the drainage in the northwestern portion of the site was modified during past industrial use, which included the construction of berms along the drainage to contain it within a confined channel. As discussed above, there is currently an approximate 3-foot-wide opening in the constructed berm along the southern edge of the drainage, which allows water to temporarily spread out into the existing wetland areas and proposed wetland mitigation area during higher flows. According to Royal Gold, the opening in the berm was constructed prior to their business moving to the site in 2009. As part of construction of the wetland mitigation area, it is proposed to enlarge the opening in the constructed berm along the southern edge of the drainage. The opening in the berm is proposed to be widened to approximately 5-8 feet to allow additional water to temporarily flow into the wetland mitigation area during higher flow events. This proposed design feature is intended to increase the likelihood of success of the proposed mitigation wetland and would not substantially increase the redirection of flood flows from the northwestern drainage beyond the environmental baseline condition. The proposed wetland mitigation area will require the excavation and removal of a significant amount of fill from the area adjacent to the drainage, which has the potential to provide additional off-channel storage during flood events. This additional off-channel storage has the potential to minimize any existing downstream flooding issues during peak storm events. As such, it is not anticipated that the proposed modification to the berm along the northwestern drainage will result in significant flooding and drainage impacts.

Therefore, the proposed project location and design would not result in significant impacts from impeding or redirecting flood flows. Therefore, the proposed project would result in a less than significant impact on this category of environmental effect.

d) *In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?*
No Impact.

According to FEMA, FIRM Panel No. 06023C0694F, the project site is located outside of a regulated flood hazard zone (FEMA, 2016). According to the inundation mapping approved

by the California Department of Water Resources Division of Safety of Dams, the project site is outside of the area that would be subject to flooding from failure of the R.W. Matthews Dam at the Ruth Reservoir (CDWR, 2021). The California Department of Conservation's Tsunami Hazard Area Map shows the project site as being located outside of a tsunami hazard zone (CDC, 2021c). There is no body of water near the project site that has the potential for the generation of a seiche. Therefore, the proposed project would not result in the release of pollutants due to project inundation. Therefore, no impact would result from the proposed project on this category of environmental effect.

e) *Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?*
Less-than-significant with Mitigation Incorporated.

Water Quality Control Plan

According to the California ArcGIS "Industrial Storm Water Map," the facility is located within the Lower Mad River Watershed (HUC 1801010204 ID) in the North Coast Region (SWRCB, 2021a). The North Coast RWQCB adopts and implements the Water Quality Control Plan (Basin Plan) for the North Coast Region which identifies beneficial uses and recognizes water quality problems unique to the region. As described in the Setting, a portion of the stormwater from the site flows into Hall Creek and the Mad River. The Mad River is CWA Section 303(d) listed for sedimentation/siltation, temperature, and turbidity (NCRWQCB, 2021b).

As discussed under the subsections above, potential water quality impacts from construction and operation of the proposed project would be reduced to less than significant through the project design elements, implementation of the proposed mitigation measures (Mitigation Measures BR-5 and HHM-1), compliance with existing regulatory requirements (Humboldt County Grading Ordinance, SWRCB CGP, SWRCB IGP, and FGCSD Wastewater Discharge Permit), and compliance with the permit conditions from the USACE, North Coast RWQCB, and CDFW. See subsections a), c.i), and c.iii) for further information. Therefore, the proposed project will not conflict with or obstruct a water quality control plan.

Sustainable Groundwater Management Plan

Water is supplied to the project site by FGCSD. FGCSD buys water from the HBMWD, which is piped from its original source – subsurface wells on the Mad River upstream from the City of Arcata. The HBMWD water is obtained from horizontal collection chambers buried approximately 100 feet below the bed of the Mad River between Blue Lake and Arcata. The HBMWD has appropriative water rights from the SWRCB through the year 2029 for surface water storage and diversion (City of Arcata, 2018). No groundwater is used or proposed to be used by the Royal Gold operation. Therefore, the proposed project will not conflict with or obstruct implementation of a sustainable groundwater management plan.

Conclusion

Therefore, the proposed project as designed, mitigated, and in compliance with existing regulatory requirements, would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Therefore, the proposed

project would result in a less-than-significant impact with mitigation incorporated on this category of environmental effect.

Mitigation Measures:

Same as **BR-5. Annual Detention Basin Maintenance Protocol.** See Section 3.2.4 – Biological Resources.

Same as **HHM-1. Soil and Groundwater Management Plan.** See Section 3.2.9 – Hazards and Hazardous Materials.

Findings: The project would have a **Less-than-significant Impact with Mitigation Incorporated** on Hydrology and Water Quality.

3.2.11 Land Use and Planning

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☒	☐	☐

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been operated from the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been occupied by industrial uses since the 1950s. It is located on sixteen separate Assessor's Parcel Numbers (APNs) on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 – Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers).

To the north of the site is rural residential development and timberland. To the east of the site are rural residential and industrial uses. To the south of the site are commercial uses, industrial uses, rural residential uses, Glendale Drive, Highway 299, Hall Creek, and the Mad River. To the west of the site are rural residential uses, Glendale Drive, Highway 299, and the Mad River.

Background

When Royal Gold moved to the site in 2009, it contained remnants of the former industrial uses including asphalt and concrete pavement, buildings, compacted gravel surfaces, constructed stormwater management features, fencing, and utility infrastructure. The majority of the improvements on the site in 2009 were in the southern portion of the site. The northern portion of the site contained compacted gravel surfaces and graded and compacted soils that were historically used for log storage (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]).

Since beginning operations at the site, Royal Gold has expended substantial capital investments to redevelop the site and remove remnant debris and equipment from past industrial uses. In addition, Royal Gold has installed security fencing, gates, and cameras to keep trespassers off the property due to problems with theft, vandalism, and various other criminal activities, which were prevalent on this vacated mill site prior to the company's use of the site.

Royal Gold applied for an after-the-fact Conditional Use Permit (CUP) in 2013 and received approval from the Humboldt County Planning Commission in August 2016. The description of

the project in the Notice of Planning Commission Decision (dated August 5, 2016; Humboldt County, 2016) stated the following:

> "*A Conditional Use permit (CUP) is being sought by the applicant (Royal Gold, LLC) to allow manufacturing and distribution of potting soil within an approximately 18.9-acre area spread across multiple parcels in the Glendale area.* ***Note: since March of 2009, Royal Gold has been operating their soil manufacturing, wholesale, and distribution business from the site, without the benefit of County review.*** *The Conditional Use Permit seeks to bring into compliance the existing soil manufacturing operation and allow expansion from approximately 60,000 cubic yards of annual production to 100,000 cubic yards, as well as placement of a new 7,800 square foot building. The proposed membrane structure utilizes an arched truss design and will be placed over an area where stockpiles of material are currently stored and utilized for similar activities. Coco pith is used as the basis for their soil products, though other components include: sawdust, compost, chicken manure, and fish bone. All of the materials used are imported and then processed at the project site. Daily operation primarily involves the importing of organic materials, grinding, screening, sorting, stockpiling, mixing, packaging, and distribution of the final soil product*."

Humboldt Baykeeper, a local non-profit organization, appealed the Commission's approval. Sometime later, Humboldt Baykeeper sued Royal Gold in federal court under the Clean Water Act. Royal Gold and Baykeeper settled the lawsuit in 2017. The primary issues raised in the appeal of the Planning Commission's approval of the Royal Gold Conditional Use Permit related to biological resources, stormwater runoff, and hazardous materials. To address the concerns raised in the appeal, Royal Gold has hired qualified professionals to prepare a number of technical reports and plans including, but not limited to, a Wetland Delineation (see Appendix 5.6; SHN, 2018c), Wetland Mitigation and Monitoring Plan (see Appendix 5.7; SHN, 2020), Updated Biological Report including biological surveys (see Appendix 5.5; SHN, 2021b), updated Stormwater Pollution Prevention Plan (see Appendix 5.9; SHN, 2021c), Soil and Groundwater Management Plan (see Appendix 5.8; SHN, 2021d), and the characterization of soils excavated for stormwater improvements (SHN, 2017c). Royal Gold has also worked diligently to improve its stormwater management practices to comply with the requirements of the State Water Resources Control Board (SWRCB) Industrial General Permit (IGP) and the settlement agreement with Humboldt Baykeeper. Royal Gold has installed numerous stormwater improvements, which have resulted in a significant reduction in the pollutant concentrations detected in stormwater discharging from the facility. In addition, Royal Gold has improved its operations to reduce impacts related to fugitive dust generation, odors, noise, and lighting. These efforts have occurred in close coordination with local, state, and federal regulatory agencies with jurisdiction over the company's activities.

The lawsuit settlement and growth of the business have spurred significant changes in the scale and scope of current and proposed site development and planned infrastructure. Recognizing that these changes to the project scale & scope render the 2016 approval by the Planning Commission insufficient, Humboldt Baykeeper has agreed to withdraw their appeal in tandem with Royal Gold's decision to seek a new Conditional Use Permit and submit to subsequent environmental review.

An updated Plan of Operations has been prepared which details the expansion and improvements at the Royal Gold facility, and identifies future improvements proposed (see Appendix 5.1;

Royal Gold, 2021). As discussed below, there are additional permit/approval types required from the County for the existing and proposed operations at the Royal Gold facility. These include:

- Special Permit: A Special Permit is required for activities within Streamside Management Areas (SMAs) at the Royal Gold facility. These activities include the filling of wetlands, the conversion of wetlands to stormwater features, encroachments into Streamside Management Areas (SMAs), and a proposed wetland mitigation area to mitigate for existing and proposed wetland impacts. As required, Royal Gold is coordinating with applicable state and federal agencies (for example, United States Army Corps of Engineers (USACE), North Coast Regional Water Quality Control Board (NCRWQCB), and California Department of Fish and Wildlife (CDFW)) to obtain permits for these activities.
- Other Regulations for Uses Permitted with a Use Permit: Some of the newly constructed and proposed buildings at the Royal Gold facility will require exceptions to the development standards of the Unclassified (U) Zone and County's Fire Safe Regulations (for example, Section 3115-2, setback for structure defensible space; Humboldt County, 1991). Exceptions are being requested to development standards including setbacks from internal property lines, distance between major buildings, and maximum ground coverage. Helping justify the requested exceptions is the fact that the facility is operated as one site, even though it includes several parcels.
- Parking Exception Petition: The number of off-street parking spaces required by Section 314-109.1 of the Humboldt County Zoning Regulations significantly exceeds the number of spaces needed for the Royal Gold facility. For this reason, Royal Gold is requesting an exception to the number of parking spaces required pursuant to Section 109.1.2.12 of the Humboldt County Zoning Regulations. The justification for the exception is based on the number of projected employees at full build-out and the levels of anticipated use.

Regulatory Setting:

Humboldt County General Plan

According to the Humboldt County Planning Department, in the 1965 Northern Humboldt General Plan, the project parcels had land use designations of Commercial Diagrammatic, Dispersed Housing, and Grazing. This was despite the fact that the project parcels had been used for industrial uses since at least the 1950s. Although the project parcels were not designated for industrial uses, it was determined through previous application approvals that industrial uses were consistent with the Commercial Diagrammatic designation.

In Volume I: Framework Plan of the prior Humboldt County General Plan (Humboldt County, 1984), the communities of Glendale and Fieldbrook were targeted for preparation of a Community Plan. A draft of the Community Plan was developed in January 2006 by the Fieldbrook-Glendale Community Services District (FGCSD; Humboldt County, 2006), whose boundaries mostly coincide with the Community Planning Area mapped under the Framework Plan. However, the draft Community Plan was never adopted by the County, and the Framework Plan did not address the project site due to its inclusion in the Fieldbrook-Glendale Community Plan Area.

In October 2017, Humboldt County adopted an update of its General Plan (Humboldt County, 2017a). Through the update, General Plan designations were assigned to the project parcels, which are shown in Table 9 – General Plan Designations for Project Parcels. As indicated in Table 9, no designation was applied to the parcels owned by North Coast Railroad Authority (NCRA), which consist of portions of the Annie and Mary railroad right-of-way. As shown in Table 9, twelve out of the sixteen parcels that contain the project site were designated Industrial General (IG), which is consistent with the existing Royal Gold soil manufacturing facility. However, despite the historic and existing use of the properties, APN 516-101-040 was designated Residential Low Density (RL) and APN 516-101-083 was designated Mixed Use (MU).

Table 9: General Plan Designations for Project Parcels

Assessor's Parcel Number	General Plan Designation
516-101-005	No designation (NCRA right-of-way)
516-101-008	Industrial General (IG)
516-101-017	Industrial General (IG)
516-101-040	Residential Low Density (RL)
516-101-041	Industrial General (IG)
516-101-060	Industrial General (IG)
516-101-063	Industrial General (IG)
516-101-064	Industrial General (IG)
516-101-068	Industrial General (IG)
516-101-079	Industrial General (IG)
516-101-081	Industrial General (IG)
516-101-083	Mixed-Use (MU)
516-101-084	Industrial General (IG)
516-111-003	No designation (NCRA right-of-way)
516-111-062	Industrial General (IG)
516-111-063	Industrial General (IG)

Conservation and Open Space Element:
Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan includes policies regarding the protection of critical habitats, sensitive habitats, SMAs, wetlands, oak woodlands, and invasive species. Critical habitats are habitats necessary for the protection of threatened or endangered species listed under the Federal Endangered Species Act (FESA). In addition to species and communities identified by the United States Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW),

migratory deer winter ranges, Roosevelt elk ranges, avian rookery/nesting sites, streams and streamside areas, and wetland areas are defined as sensitive habitats (Humboldt County, 2017a).

Standard BR-S5 in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan provides a definition of SMAs, which include a natural resource area along both sides of streams containing the channel and adjacent land. SMAs do not include watercourses consisting entirely of a man-made drainage ditch, or other man-made drainage device, construction, or system (Humboldt County, 2017a).

SMAs are areas specifically mapped as SMA and Wetland (WR) Combining Zones, subject to verification and adjustment pursuant to site-specific biological reporting and review procedures. For areas along streams not specifically mapped as SMA and WR Combining Zones, the outer boundaries of the SMA shall be defined as:

1. 100 feet, measured as the horizontal distance from the top of bank or edge of riparian drip-line whichever is greater on either side of perennial streams.
2. 50 feet, measured as the horizontal distance from the top of bank or edge of riparian drip-line whichever is greater on either side of intermittent streams.
3. The width of Streamside Management Areas shall not exceed 200 feet measured as a horizontal distance from the top of bank.

SMAs may be reduced or eliminated where the County determines, based on specific factual findings, that the mapping of the SMA is not accurate, there are no in-channel wetland characteristics or off-channel riparian vegetation, and the reduction will not significantly affect the biological resources of the SMA on the property. When the prescribed buffer would prohibit development of the site for the principal use for which it is designated, measures shall be applied that result in the least environmentally damaging feasible project (Humboldt County, 2017a).

Standard BR-S11 in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan provides a definition of wetlands, which states the following:

> "*The County shall follow the US Army Corps of Engineers Wetland Delineation manual in the identification and classification of wetlands which considers wetlands as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas*." (Humboldt County, 2017a)

Standard BR-S10 in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan provides the development standards for wetlands. Setbacks for wetlands begin at the edge of the delineated wetland and the widths of the SMA for wetlands is 50 feet for seasonal wetlands and 150 for perennial wetlands. Buffers may be reduced based on site-specific information and consultation with the CDFW. No buffer shall be required for man-made wetlands except wetlands created for mitigation purposes.

Noise Element:
The Humboldt County General Plan Noise Element (Chapter 13) contains noise compatibility standards, which are found in Table 13-C (Land Use/Noise Compatibility Standards). The noise standards in Table 13-C are based on the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (Ldn). CNEL is a 24-hour energy equivalent level derived from a variety of single-noise events, with weighting factors of 5 and 10 A-weighted Decibels (dBA) applied to the evening (7 p.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods, respectively, to allow for the greater sensitivity to noise during those hours. Ldn is the average sound level in decibels, excluding frequencies beyond the range of the human ear, during a 24-hour period with a 10 dB weighting applied to nighttime sound levels. Since CNEL and Ldn are a daily average, allowable noise levels can increase in relation to shorter periods of time. Table 13-C provides the maximum interior and exterior noise levels by land use category. For single-family residences, 60 dBA CNEL/Ldn is considered a normally acceptable exterior noise level. As stated on page 13-6 of the Noise Element, "*A standard construction wood frame house reduces noise transmission by 15 dBA. Since interior noise levels for residences are not to exceed 45 dBA, the maximum exterior noise level for residences is 60 dBA without requiring additional insulation*" (Humboldt County, 2017a).

Humboldt County Code

The parcels comprising the Royal Gold facility are all currently zoned Unclassified (U). The purpose of the U Zone, as stated in Section 314-8.1 of the Humboldt County Zoning Regulations (Humboldt County, 2021b) is the following:

> "*As provided in this Code, all of the unincorporated area of the County not otherwise zoned is designated as the Unclassified or U Zone. This area has not been sufficiently studied to justify precise zoning classifications. The following Code sections have been adopted to protect the health, safety and general welfare of the citizens and to insure orderly development in conformance with the General Plan*."

The U Zone only allows a limited number of land uses as principally permitted (allowed by right with no discretionary review), which includes single-family residences, general agriculture, rooming, boarding of not more than two (2) persons, and manufactured homes. All other uses may be permitted upon the granting of a Use Permit. For this reason, an after-the-fact Conditional Use Permit was required for the Royal Gold soil operation.

The development standards required in the U Zone are listed in Table 10. Under the section entitled "*Other Regulations for Uses Permitted with a Use Permit*", the U Zone allows exceptions to development standards such as setbacks, ground coverage, distance between major buildings, etc. with the review and granting of a Conditional Use Permit. As stated in this section of the U Zone regulation, "*The building height, site area, setbacks and other requirements for all other uses shall be as required by the Planning Commission in the granting of a Use Permit*."

Table 10: Unclassified (U) Zone Development Standards

Development Standard	Requirement
Front yard setback	Twenty feet (20')
Side yard setback	Five feet (5')
Rear yard setback	Ten feet (10')
Distance between major buildings	Twenty feet (20')
Maximum ground coverage	Forty percent (40%)
Maximum building height	None specified

In addition to the U Zone development standards, Section 3115-2 of the County Fire Safe Regulations (Humboldt County, 1991) also requires that all parcels one (1) acre and larger shall meet a minimum 30-foot setback for buildings and accessory buildings from all property lines and/or the center of a road. For parcels less than one (1) acre, the County shall provide for the same practical effect, which is further defined in the regulations.

Humboldt County is currently in the process of updating its Zoning Classifications and mapping to promote consistency with the recent changes to General Plan land use mapping performed during adoption of the 2017 General Plan. As noted above, though developed with industrial uses for decades, the zoning of the project parcels and much of the Glendale area remains currently Unclassified (such as, U Zone). Through the update of the County's Zoning Classifications, the project parcels will be rezoned for consistency with the recently adopted General Plan Designations (see Table 9).

Streamside Management Areas and Wetlands Ordinance (SMAWO):

Humboldt County Code Section 314-61.1 (Streamside Management Areas and Wetlands Ordinance [SMAWO]) implements the goals, policies, and standards for streamside management areas, wetlands, and other wet areas contained in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan. All development within or affecting SMAs, wetlands, or other wet areas not exempted under County Code Section 314-61.1.4, requires a Special Permit from the County. Section 61.1.4.1 exempts routine maintenance activities from the requirement to obtain a Special Permit, which are defined as "*activities to support, keep and continue in an existing state or condition without decline*." Routine maintenance activities include the replacement of culverts and related structures when conducted pursuant to a CDFW Lake and Streambed Alteration (LSA) Agreement.

Off-Street Parking:

The off-street parking requirements applicable to the Royal Gold operation are contained in Section 314-109.1 of the Humboldt County Zoning Regulations (Humboldt County, 2021b). The parking requirements for the land use types proposed by Royal Gold are shown in Table 11.

Table 11: Off-Street Parking Requirements by Land Use Type

General Use Type	Specific Use Type	Parking Requirement
Commercial	Offices	One (1) parking space for every 300 square feet of gross floor area plus one (1) space for each employee.
Industrial	Warehouse	The higher of one parking space for each 1,500 square feet of gross floor area space within all enclosed building areas or one (1) parking space for each employee at the peak shift.
Industrial	Manufacturing	The higher of one (1) parking space for every four (4) employees or one (1) parking space for each 2,500 square feet of gross floor area.

Section 109.1.2.12 of the County Zoning Regulations allows exceptions to the requirements for the number of off-street parking spaces with a Special Permit. Exceptions may be granted by the Hearing Officer based upon the following factors:

- Geographic location of site
- Site-specific topographic constraints
- Historically designated structures
- Proximity to urban built-up areas
- Levels of anticipated use

Analysis:

a) *Physically divide an established community?*
No Impact.

The project site is located within the unincorporated community of Glendale and is surrounded by commercial, industrial, and rural residential uses. The proposed project will make use of an existing industrial site that has been in industrial use since the 1950s. Access to the project site is provided by existing roadways including Glendale Drive and Highway 299. The project does not propose large infrastructure improvements (for example, highway, canal, etc.) that have the potential to physically divide the community of Glendale. Therefore, the proposed project would not physically divide an established community. Therefore, the proposed project would result in no impact on this category of environmental effect.

b) *Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?*
Less-than-significant with Mitigation Incorporated.

As discussed throughout this document, Royal Gold is required to comply with a myriad of federal, state, and local regulations related to all aspects of their business. Many of these regulations are for the purpose of avoiding or mitigating an environmental effect. The proposed project has been designed in compliance with applicable regulations, except for the following policies and standards:

- The applicant proposes continued industrial use on two properties designated as Mixed-Use (MU) or Residential Low-Density (RL) as part of the 2017 County General Plan Update.
- The applicant is requesting exceptions to the development standards in the Unclassified (U) Zone and County Fire Safe Regulations for the proposed structures.
- The applicant is requesting an exception to the off-street parking requirements in the County Code.
- There are existing and proposed impacts to wetlands and encroachments into SMAs at the facility.
- Some of the processing activity at the facility is currently in exceedance of the noise compatibility standards for residential uses in the County General Plan Noise Element.

The potential environmental impacts from exceptions to the General Plan designations, development standards in the U Zone and Fire Safe Regulations, and off-street parking requirements are analyzed below. Existing and proposed impacts to wetlands and encroachments into SMAs are addressed in Section 3.2.4 – Biological Resources. Potential impacts from exceedance of the noise standards in the County General Plan Noise Element are addressed in Section 3.2.13 – Noise.

Continued industrial use on properties designated as MU and RL:
As discussed in the Setting, Royal Gold applied for an after-the-fact CUP in 2013 and received approval from the Humboldt County Planning Commission in August 2016. Humboldt Baykeeper, a local non-profit organization, appealed the Commission's approval and the CUP has been on appeal since that time. In 2017, Humboldt County adopted an update of its General Plan (Humboldt County, 2017a). Through the update, General Plan designations were assigned to the project parcels, which are shown in Table 9 – General Plan Designations for Project Parcels. As indicated in Table 9, no designation was applied to the parcels owned by NCRA, which consist of portions of the Annie and Mary railroad right-of-way. As shown in Table 9, twelve out of the sixteen parcels that contain the project site were designated Industrial General (IG), which is consistent with the existing Royal Gold soil manufacturing facility. However, despite the historic and existing use of the properties, APN 516-101-040 was designated RL and APN 516-101-083 was designated MU. Because Royal Gold has been using the project parcels for industrial type uses since before the adoption of the General Plan Update, and applied for a Conditional Use Permit in 2013, the Royal Gold soil operation can be viewed as continuation of historical industrial uses on APNs 516-101-040 and 516-101-083 (see Figure 3 – Assessor Parcel Numbers). Royal Gold's continued use of these areas can be viewed as a type of legal non-conforming or "grandfathered" use.

The designation of APNs 516-101-040 and 516-101-083 for residential and mixed uses was to provide additional areas for residential and commercial development in the community of Glendale. Under the proposed project, APN 516-101-040 (designated RL) would primarily be developed as a wetland mitigation area, with a smaller portion being used for industrial activity. APN 516-101-083 (designated MU) would continue to be used for industrial purposes as it has been for decades (see Figure 3 – Assessor Parcel Numbers; Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]; and Figure 6 – Site Plan). The

potential impacts of using these parcels for wetland mitigation or continued industrial use have been analyzed throughout this document. In all instances where potentially significant impacts have been identified, mitigation is provided to reduce each impact to less-than-significant levels. No additional mitigation measures beyond those already identified would be required for the proposed project. Therefore, as mitigated, impacts related to the proposed use of APNs 516-101-040 and 516-101-083 would be less than significant.

Exceptions to development standards in the U Zone and Fire Safe Regulations:
As shown in Figure 3 – Assessor Parcel Numbers, the Royal Gold site is composed of sixteen separate parcels. These parcels are operated as one facility and the existing metal buildings from past industrial uses do not comply with some of the development standards in the U Zone or the Fire Safe Regulations. The proposed buildings would also be located in areas of the project site that do not meet the development standards in the U Zone or the Fire Safe Regulations. The exceptions being requested from the development standards are primarily for setbacks required from internal parcel property lines that exist within the facility boundary. The specific exceptions that are anticipated to be required for each building are discussed below:

- Building C: Construction of an approximately 14,000-square-foot (200-foot by 70-foot) building directly south of Building A and associated utility infrastructure (for example, electricity, water, etc.; see Figure 6 – Site Plan). This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it would require exceptions to the setback requirements in the Fire Safe Regulations, due to internal parcel lines. Building C is proposed to be used for the storage and processing of coconut fiber.
- Building D: Construction of an approximately 30,000-square-foot (100-foot by 300-foot) building in the central northern portion of the site and associated utility infrastructure (for example, electricity, water, etc.; see Figure 6 – Site Plan). This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it is located on a portion of APN 516-111-062 that may require an exception to the setback requirement in the Fire Safe Regulations, due to internal parcel lines. Building D is proposed to be used for the storage and processing of various raw and finished materials.
- Building E: Construction of an approximately 42,500-square-foot (250-foot by 170-foot) building and associated utility infrastructure (for example, electricity, water, etc.) in the central portion of the site in the area currently used as the bulk soil yard. This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it is located on a portion of APN 516-111-062 that may require an exception to the setback requirement in the Fire Safe Regulations, due to internal parcel lines. This building would be used for the processing, storage, and packaging (as applicable) of soil material, as is currently occurring in this area of the site.
- Building F or Addition to Existing Building: This improvement would involve either: 1) construction of an approximately 2,000-square-foot (40-foot by 50-foot) two-story building adjacent to the eastern edge of the existing pole-shed-style metal building on

APN 516-101-079; or 2) construction of an approximately 2,000-square-foot addition to the eastern portion of the existing pole-shed-style metal building on APN 516-101-079 (see Figure 6 – Site Plan). Both potential options would be constructed of metal. If a new, standalone building is constructed, it appears that it would require exceptions to the requirements for the minimum distance between major buildings and the maximum ground coverage. If an addition to the existing building is constructed, it appears that it would require an exception to the requirements for maximum ground coverage. Both potential options noted above are proposed to be used for bathrooms and offices.

Under the section entitled "*Other Regulations for Uses Permitted with a Use Permit*", the U Zone allows exceptions to development standards such as setbacks, ground coverage, distance between major buildings, etc. with the review and granting of a Conditional Use Permit. As stated in this section of the U Zone regulation, "*The building height, site area, setbacks and other requirements for all other uses shall be as required by the Planning Commission in the granting of a Use Permit*."

The primary justification for the proposed exceptions is that the Royal Gold facility is operated as one site, even though it includes several parcels. In addition, there is limited vegetation within the facility boundary that would necessitate maintaining defensible space and the new buildings being proposed will be constructed of materials that are fire resistant including metal and cinder block. As such, the purpose for the development standards would still be met if the proposed exceptions are granted. The potential impacts from construction and operation of the proposed buildings have been analyzed throughout this document. In all instances where potentially significant impacts have been identified, mitigation is provided to reduce each impact to less-than-significant levels. No additional mitigation measures beyond those already identified would be required for the proposed project. Therefore, as mitigated, impacts from construction and operation of the proposed buildings would be less-than-significant.

Off-street parking exception request:
The Royal Gold soil operation consists of several land use types including office, warehouse, and manufacturing. As discussed in the Setting, the off-street parking requirements applicable to the operation are contained in Section 314-109.1 of the Humboldt County Zoning Regulations (Humboldt County, 2021b). The proposed square footage of the different uses at the Royal Gold facility at full build-out, the number of employees, and the required number of off-street parking spaces are shown in Table 12.

Table 12: Required Number of Off-Street Parking Spaces

Type of Use	Area (Square Foot)	# of Employees	# of Off-Street Parking Spaces	Basis of Calculation
Office	3,963	8	21	Square Footage & # of Employees
Warehouse	7,460	6	6	Square Footage
Manufacturing	174,480	51	70	Square Footage
TOTAL	**185,903**	--	**97**	--

Based on the County's off-street parking requirements, Royal Gold is required to provide 97 off-street parking spaces at its facility. The number of off-street parking spaces required by the Zoning Regulations significantly exceeds the number of parking spaces needed at full build-out of the Royal Gold facility. Section 109.1.2.12 of the Zoning Regulations allows exceptions to the requirements for the number of off-street parking spaces with a Special Permit. Exceptions may be granted by the Hearing Officer based upon the following factors:

- Geographic location of site
- Site-specific topographic constraints
- Historically-designated structures
- Proximity to urban built-up areas
- Levels of anticipated use

As allowed by Section 109.1.2.12 of the Zoning Regulations, Royal Gold is requesting an exception to the number of parking spaces required for their business. Royal Gold is requesting that the number of parking spaces be based on the number of employees, instead of square footage or square footage and the number of employees. As such, the justification for the exception petition is the level of anticipated use at the Royal Gold facility.

The number of employees at full build-out is estimated to be just over what it is now, approximately 65 employees. This is because even though Royal Gold's production level is anticipated to increase over time, the company will be automating its manufacturing processes, which is not expected to require an increase in the number of employees. There are currently 73 off-street parking spaces at the facility (including three ADA accessible spaces), which are expected to be sufficient parking for employees and visitors at full build-out (see Figure 6 – Site Plan). Therefore, the exception petition is requesting a reduction of 24 off-street parking spaces.

The referral response received from the Humboldt County Department of Public Works on April 26, 2021 stated that the Department has no objection to the off-street parking exception request provided that no employees use Glendale Drive for parking (Freed, 2021). As discussed above, there is sufficient onsite parking for the anticipated number of employees and visitors at full buildout of the proposed project. Therefore, based on the design and location of the proposed project, the requested parking exception would result in a less-than-significant impact.

Conclusion:
As discussed throughout this document, in all instances where potentially significant impacts have been identified, mitigation is provided to reduce each impact to less-than-significant levels. This was necessary in the following sections:

- Aesthetics (Section 3.2.1)
- Air Quality (Section 3.2.3)
- Biological Resources (Section 3.2.4)

- Cultural Resources (Section 3.2.5)
- Energy (Section 3.2.6)
- Hazards and Hazardous Materials (Section 3.2.9)
- Hydrology and Water Quality (Section 3.2.10)
- Noise (Section 3.2.13)

No additional mitigation measures beyond those already identified would be required for the proposed project. Therefore, based on the analysis in this document and proposed mitigation, the proposed project will not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Therefore, the proposed project would result in a less-than-significant impact with mitigation incorporated on this category of environmental effect.

Mitigation Measures: Same as the following Mitigation Measures related to construction and operation of the proposed project:

AE-1. **International Dark-Sky Association Standards** (see Section 3.2.1 – Aesthetics)

AQ-1. **Facility Dust Mitigation and Housekeeping Plan** (see Section 3.2.3 – Air Quality)

AQ-2. **Odor Impact Minimization Plan** (see Section 3.2.3 – Air Quality)

BR-1. **Wetland Mitigation** (see Section 3.2.4 – Biological Resources)

BR-2. **Habitat Enhancements for Encroachment into Streamside Management Areas (SMAs)** (see Section 3.2.4 – Biological Resources)

BR-3. **Seasonal Restrictions on Maintenance of Stormwater Detention Basins** (see Section 3.2.4 – Biological Resources)

BR-4. **Special-status Amphibian Surveys** (see Section 3.2.4 – Biological Resources)

BR-5. **Annual Detention Basin Maintenance Protocol** (see Section 3.2.4 – Biological Resources)

BR-6. **Nesting Bird Surveys** (see Section 3.2.4 – Biological Resources)

BR-7. **Wildlife Movement** (see Section 3.2.4 – Biological Resources)

CR-1. **Inadvertent Discovery** (see Section 3.2.5 – Cultural Resources)

CR-2. **Human Remains** (see Section 3.2.5 – Cultural Resources)

EN-1. **RCEA Repower+ Program** (see Section 3.2.6 – Energy)

HHM-1. **Soil and Groundwater Management Plan** (see Section 3.2.10 – Hydrology and Water Quality)

NO-1. **Construction Noise Limitations** (see Section 3.2.13 – Noise)

NO-2. **<u>Operational-Related Noise Control Measures</u>** (see Section 3.2.13 – Noise)

<u>Findings</u>: The project would have **a Less-than-significant Impact with Mitigation Incorporated** on Land Use and Planning.

3.2.12 Mineral Resources

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recover site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Environmental Setting:

A mineral resource is land on which known deposits of commercially viable mineral or aggregate deposits exist. The designation is applied to sites determined by the State Division of Mines and Geology as being a resource of regional significance and is intended to help maintain any quarrying operations and protect them from encroachment of incompatible uses. The Mad River, which is located south and west of the project site, contains sand and gravel resources that are mined annually. Additionally, there are several quarries that exist in the Mad River Valley area. The project site does not contain any known mineral resources.

Analysis:

a) *Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?*
No Impact.

There are no known deposits of commercially-viable mineral or aggregate on the project site. The mineral resources available locally in the Mad River Valley area will not be impacted by the location of a soil operation on a site that has been used for industrial purposes since the 1950s. As such, the proposed project will not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State. Therefore, the proposed project would result in no impact on this category of environmental effect.

b) *Result in the loss of availability of a locally important mineral resource recover site delineated on a local general plan, specific plan, or other land use plan?*
No Impact.

There are no known deposits of commercially-viable mineral or aggregate on the project site. None of the activities proposed by the project will result in the loss of availability of known mineral resources or loss of availability of a locally-important mineral resource recovery site. Figure 10.1 – Rock and Mineral Extraction Sites of the Conservation and Open Space Element of the County General Plan does not identify the project site as a rock and mineral extraction site (Humboldt County, 2017a). As such, the proposed project will not result in the loss of availability of a locally-important mineral resource recovery site delineated on a local

General Plan, specific plan, or other land use plan. Therefore, the proposed project would result in no impact on this category of environmental effect.

Mitigation Measures: No mitigation required.

Findings: The project would have **No Impact** on Mineral Resources.

3.2.13 Noise

Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. It is located on sixteen separate parcels on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 – Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan).

The project site is near Highway 299 (distance to highway varies from approximately 175 feet to 1,000 feet), Glendale Drive, adjacent industrial operations, low-density residential uses, a bowling alley, and Murphy's Market. As such, ambient noise levels have been historically and are currently elevated, though intermittent, in the vicinity of the project site. Noise measurements have been taken at the site periodically since 2012. The measurements have consistently shown Highway 299 to be the predominant ambient noise source in the vicinity of the project site.

There are residential properties surrounding the Royal Gold facility. The closest residences to the most active areas at the facility are located to the west, south, and north of the southwest portion of the site adjacent to Assessor's Parcel Numbers (APNs) 516-101-079 and -083. The closest residence to the west is within approximately 40 feet of the western boundary of APN 516-101-083. The closest residence to the south is within approximately 90 feet of the southern boundary of APN 516-101-079. The closest residence to the north is located on a bluff above the project site and is within 120 feet of the northern boundary of APN 516-101-083 (see Figure 2 – Project Area, Figure 3 – Assessor Parcel Numbers, and Figure 6 – Site Plan).

The project site is located approximately 6.5 miles southeast of the California Redwood Coast-Humboldt County Airport in McKinleyville. The project site is not located in the vicinity of any private airstrips.

Regulatory Setting:

Local Laws – Humboldt County General Plan

The Humboldt County General Plan Noise Element (Chapter 13) contains noise compatibility standards, which are found in Table 13-C (Land Use/Noise Compatibility Standards). The noise standards in Table 13-C are based on the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (Ldn). CNEL is a 24-hour energy equivalent level derived from a variety of single-noise events, with weighting factors of 5 and 10 A-weighted Decibels (dBA) applied to the evening (7 p.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods, respectively, to allow for the greater sensitivity to noise during those hours. Ldn is the average sound level in decibels, excluding frequencies beyond the range of the human ear, during a 24-hour period with a 10 dB weighting applied to nighttime sound levels. Since CNEL and Ldn are a daily average, allowable noise levels can increase in relation to shorter periods of time. Table 13-C provides the maximum interior and exterior noise levels by land use category. For single-family residences, 60 dBA CNEL/Ldn is considered a normally acceptable exterior noise level. As stated on page 13-6 of the Noise Element, "*A standard construction wood frame house reduces noise transmission by 15 dBA. Since interior noise levels for residences are not to exceed 45 dBA, the maximum exterior noise level for residences is 60 dBA without requiring additional insulation*" (Humboldt County, 2017a).

Analysis:

a) *Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*
Less-than-significant with Mitigation Incorporated.

This project, by its relative nature, contributes to ambient noise levels only during periods of operation. Project-related sounds occur year-round and are limited to daytime operations. Royal Gold operates within the hours of 7 a.m. to 7 p.m., Monday through Saturday. As noted in Section 2.3.3 – Proposed Improvements/Operational Changes, operations are also proposed on Sundays from 8 a.m. to 6 p.m. Noise sources from the Royal Gold operation occur from a variety of stationary equipment and mobile equipment/vehicles. The majority of noise-generating activity at the Royal Gold operation currently takes place in the southwest portion of the site on APNs 516-101-079 and 516-101-083. This is where the horizontal grinder and mixing and bagging lines are located.

The closest residences to the most active areas at the facility are located to the west, south, and north of the southwest portion of the site adjacent to APNs 516-101-079, -083. The closest residence to the west is within approximately 40 feet of the western boundary of APN 516-101-083. The closest residence to the south is within approximately 90 feet of the southern boundary of APN 516-101-079. The closest residence to the north is located on a bluff above the project site and is within 120 feet of the northern boundary of APN 516-101-

083 (see Figure 2 – Project Area, Figure 3 – Assessor Parcel Numbers, and Figure 6 – Site Plan).

As discussed in the Setting, the Humboldt County General Plan Noise Element (Chapter 13) contains noise compatibility standards, which are found in Table 13-C (Land Use/Noise Compatibility Standards). The noise standards in Table 13-C are based on CNEL or Ldn. Table 13-C provides the maximum interior and exterior noise levels by land use category. For single-family residences, 60 dBA CNEL/Ldn is considered a normally acceptable exterior noise level. Based on the noise compatibility standards in Table 13-C of the General Plan Noise Element, 60 dBA CNEL/Ldn is used as the noise threshold in this analysis. If the noise levels generated by the Royal Gold operation are less than 60 dBA CNEL/Ldn at the outdoor activity areas of adjacent residential properties, then impacts would be less than significant. If the noise levels exceed this standard, then mitigation would be required.

Construction

Construction activities generally are temporary and have a short duration, resulting in periodic increases in the ambient noise environment. Construction of the proposed improvements to the Royal Gold facility are anticipated to occur intermittently over several years and would include activities such as site preparation, grading, trenching, building construction, paving, architectural coating, installation of stormwater improvements, landscaping, and construction of a wetland mitigation area. Ground-borne noise and other types of construction-related noise impacts typically occur during the demolition and grading phases. These phases of construction have the potential to create the highest levels of noise. Activities and equipment involved in the construction of the proposed project would generate maximum noise levels ranging from 85 to 89 dBA at a distance of 50 feet (FHWA, 2006). These noise levels have the potential to cause significant impacts to sensitive receptors surrounding the project site without mitigation.

As noted above, the project site is in an elevated noise environment due to the proximity to Highway 299 and nearby industrial operations. Given its temporary nature, construction activities would result in a short-term noise impact in the vicinity of the project site. To mitigate the noise impacts from short-term construction activities, Mitigation Measure NO-1 has been required for the proposed project. Mitigation Measure NO-1 limits construction activities to the hours between 8:00 a.m. and 5:00 p.m. Monday through Friday, and between the hours of 9:00 a.m. and 5:00 p.m. on Saturdays and Sundays. Additionally, construction activity would not be allowed to occur on holidays. With implementation of Mitigation Measure NO-1, impacts to nearby sensitive receptors from construction activities would be less than significant.

Operation

To determine whether the current activities at the Royal Gold soil operation comply with the 60 dBA CNEL/Ldn standard, noise measurements have been taken on several occasions within the last year along the exterior property lines of the facility. The noise measurements were taken along property lines that are shared with residential properties, which occur along the southwest, south, eastern, and western property lines. Several types of noise measurements were taken at the facility ranging from 10-minute Leq measurements to 24-hour CNEL/Ldn measurements. The 24-hour CNEL/Ldn measurements indicated that the stationary equipment activity on APN 516-101-079 (horizontal grinder) exceeds the 60 dBA CNEL/Ldn noise standard by approximately 4 dBA CNEL/Ldn at the residential properties

to the south (APNs 516-101-036 and -058) and northwest (APNs 516-101-056 and -073). APN 516-101-079 contains a pole-shed building that houses the horizontal grinder and automated bagging line (see Figure 6 – Site Plan). The horizontal grinder was observed to produce the highest sound levels of the equipment used by Royal Gold. Otherwise, the noise measurements indicated that the operations at the Royal Gold facility comply with the 60 dBA CNEL/Ldn noise standard at the other residential properties around the facility.

Based on the results of the noise measurements taken at the Royal Gold facility, mitigation is required to reduce the sound levels of the horizontal grinder on APN 516-101-079 to below the County's noise standard for residential uses. Mitigation options include the following:

1) Removal of the horizontal grinder (currently operated from within the pole-shed building on APN 516-101-079) and relocation to the inside of Building A, located in the central portion of the site;
2) Conduct all grinding activity from the central portion of the site adjacent to Building A and replace the horizontal grinder with equipment that produces lower sound levels (coir buster); and/or
3) Install sound attenuation improvements (for example, walls or sound curtains) having a minimum sound transmission class (STC) rating of 20 along the open sides of the pole-shed building on APN 516-101-079.

Table 13 provides estimates of the noise levels that would result from implementation of each of the mitigation options noted above. The estimates regarding relocation of the grinding activity to the central portion of the site are based on noise measurements of the horizontal grinder and a new piece of equipment that is proposed to replace the grinder (coir buster). The estimate of noise level reductions from the installation of sound attenuation improvements is based on a conservative sound level reduction for wall construction or sound curtains with an STC rating of 20 (NAIMA, 1997).

Table 13: Estimated Noise Levels with Noise Mitigation

Mitigation Options	Estimated Noise Level at Closest Residential Property Line (dBA CNEL/Ldn)
Option 1: Relocation of the horizontal grinder to Building A in the central portion of the site	57.8[1]
Option 2: Relocation of grinding activity to the central portion of the site near Building A and replacement of the horizontal grinder with equipment that produces lower sound levels (coir buster)	55.8[2]
Option 3: Installation of sound attenuation improvements (for example, walls or sound curtains) that have a minimum STC rating of 20 along the open sides of the building on APN 516-101-079	<58[3]

Mitigation Options	Estimated Noise Level at Closest Residential Property Line (dBA CNEL/Ldn)
1. The estimate is based on noise measurements taken in March 2021 of the horizontal grinder when it was being operated in Building A (see Figure 6- Site Plan). The measurements were taken adjacent to the closest residential property line (APN 516-101-061) to the grinding activity, which is directly west of Building A. 2. The estimate is based on noise measurements taken in January 2022 of the equipment that is proposed to replace the horizontal grinder (coir buster) when it was being operated directly south of Building A (see Figure 6 – Site Plan). The measurements were taken adjacent to the closest residential property line (APN 516-101-061) to the grinding activity, which is directly west of Building A. 3. The estimate is based on a conservative sound level reduction for wall construction or sound curtains with an STC rating of 20 (NAIMA, 1997).	

The above mitigation options are incorporated as Mitigation Measure NO-2 for the proposed project. As indicated in Table 13, each mitigation option is estimated to reduce noise levels from grinding activity to below the County's 60 dBA CNEL/Ldn noise standard. To verify the effectiveness of the chosen mitigation option(s), Royal Gold will be required to hire an acoustical expert to conduct a Noise Study. Based on the noise measurements taken during operation of the horizontal grinder and coir buster, it is reasonable to conclude that the mitigation options will be effective in achieving compliance with the County's noise standard. However, if the chosen mitigation is determined to be ineffective in reducing the sound levels to below the County's 60 dBA CNEL/Ldn noise standard, additional mitigation and noise measurements will be required until the standard is achieved. With implementation of Mitigation Measure NO-2, impacts to nearby sensitive receptors from project operation will be less than significant.

Conclusion
Therefore, the proposed project as designed and mitigated, would not result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. Therefore, the proposed project would result in a less-than-significant impact with mitigation incorporated on this category of environmental effect.

b) *Generation of excessive groundborne vibration or groundborne noise levels?*
Less-than-significant Impact.

The proposed project's construction and operational activity has the potential to result in minor groundborne vibration and groundborne noise from the use of stationary and mobile equipment. The closest land uses potentially impacted by groundborne vibration and groundborne noise are surrounding residential uses and the bowling alley. Ground vibrations from the use of stationary and mobile equipment rarely reaches the levels that can damage structures. Any potential damage would typically be due to direct proximity to a structure, which would not occur during construction or operations at the Royal Gold facility. Pile-driving during construction generates the highest levels of vibration; however, pile-driving would not occur during construction of the proposed improvements. Although minor vibration may occur from the proposed construction and operational activities at the nearest land uses, it is not anticipated that the proposed project would result in the generation of

excessive groundborne vibration or groundborne noise levels. Therefore, the proposed project would result in a less-than-significant impact on this resource category.

c) *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*
Less-than-significant Impact.

The project site is located approximately 6.5 miles southeast of the California Redwood Coast-Humboldt County Airport in McKinleyville and the project site is not located in the vicinity of any private airstrips. The project site is not located within the Airport Compatibility Zones for the California Redwood Coast-Humboldt County Airport and the closest flight path occurs to the west of the site (Humboldt County, 2021a). Therefore, the proposed project would not expose people residing or working in the project area to excessive noise levels from airport activity. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

Mitigation Measures:

NO-1. Construction Noise Limitations. The following measure will be implemented during construction activities to reduce noise levels:

- Construction activities shall be restricted to the hours between 8:00 a.m. and 5:00 p.m. Monday through Friday, and between the hours of 9:00 a.m. and 5:00 p.m. on Saturdays and Sundays.
- Construction activity will not occur on holidays.

NO-2. Operation-Related Noise Control Measures. The following measure regarding the project's operation-related noise shall be implemented within one-year of the effective date of the Conditional Use Permit to reduce the sound levels of the horizontal grinder on APN 516-101-079 to below the County's noise standard for residential uses. Mitigation options include the following:

- Removal of the horizontal grinder (currently operated from within the pole-shed building on APN 516-101-079) and relocation to the inside of Building A, located in the central portion of the site;
- Conduct all grinding activity from the central portion of the site adjacent to Building A and replace the horizontal grinder with equipment that produces lower sound levels (coir buster); and/or
- Install sound attenuation improvements (for example, walls or sound curtains) having a minimum sound transmission class (STC) rating of 20 along the open sides of the pole-shed building on APN 516-101-079.

Royal Gold shall implement one or more of these options as required to achieve compliance with the County's 60 dBA CNEL/Ldn noise standard. To verify the effectiveness of the implemented mitigation option(s), Royal Gold shall hire an acoustical expert to conduct a Noise Study. If the implemented mitigation is determined to be ineffective in reducing the sound levels to below the County's 60 dBA CNEL/Ldn noise standard, additional mitigation and noise measurements shall be required until the standard is achieved. All documentation related to Royal Gold's compliance with the County noise standards (for example, Noise Study Report, sound measurement logs, etc.) shall be submitted to the County Planning and Building Department for review and approval.

Findings: The project would have a **Less-than-significant Impact with Mitigation Incorporated** on Noise.

3.2.14 Population and Housing

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located in the unincorporated community of Glendale in Humboldt County on an existing industrial site that has been used for industrial purposes since the 1950s. It is located on sixteen separate parcels on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 – Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers). Rural residential development is located surrounding the project site. There is no residential development existing on the project site.

Humboldt County is a rural county with a large land area and low population density. According to the California Department of Finance (CA DOF), the county's estimated 2021 population is 130,851, which represents a decrease of 1.5% from 2020 (CA DOF, 2021a). According to CA DOF, Humboldt County is estimated to contain a total of 63,697 housing units. This includes 28,566 units in the incorporated portions of the County and 35,131 units in the unincorporated portions (CA DOF, 2021b).

Analysis:

a) *Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*
Less-than-significant Impact.

The proposed project seeks after-the-fact authorization for expanded operations and existing improvements made to the site since Royal Gold began operating its potting soil manufacturing business there in March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of its growing business.

The proposed project does not include the development of housing and will not result in an increase in population. The number of employees at full build-out as proposed by this project is estimated to be approximately 65 employees. Operation of a potting soil manufacturing business is not of the nature to result in substantial population growth. Infrastructure and utilities extended to the site (for example, electrical service) will be designed to serve the proposed project and will not result in additional capacity that would be growth inducing. As such, the proposed project would not directly or indirectly induce substantial unplanned population growth in the area. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

b) *Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?*
No Impact.

The project site is developed with an industrial operation and does not contain any housing. As such, the proposed project would not result in the removal or displacement of substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere. Therefore, the proposed project would result in no impact on this category of environmental effect.

Mitigation Measures: No mitigation required.

Findings: The project would have a **Less-than-significant Impact** on Population and Housing.

3.2.15 Public Services

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Fire protection?	☐	☐	☒	☐
b) Police protection?	☐	☐	☒	☐
c) Schools?	☐	☐	☒	☐
d) Parks?	☐	☐	☒	☐
e) Other public facilities?	☐	☐	☒	☐

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. It is located on sixteen separate parcels on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 – Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers).

To the north of the site is rural residential development and timberland. To the east of the site are rural residential and industrial uses. To the south of the site are commercial uses, industrial uses, rural residential uses, Glendale Drive, Highway 299, Hall Creek, and the Mad River. To the west of the site are rural residential uses, Glendale Drive, Highway 299, and the Mad River.

Fire protection services are provided to the project site by the Blue Lake Fire Protection District (BLFPD) and/or the California Department of Forestry and Fire Protection (CAL FIRE). The nearest fire station is located in the City of Blue Lake, which is approximately 1.5 miles to the southeast of the project site on the south side of Highway 299.

Law enforcement services are provided to the project site by the Humboldt County Sheriff's Department. The nearest sheriff substation is the McKinleyville substation, approximately 6 miles northwest of the project site.

There are several school districts surrounding the unincorporated community of Glendale: Northern Humboldt Union High School District, McKinleyville Union School District, Blue Lake Union Elementary School District, Fieldbrook Elementary School District, and Arcata School District. The closest elementary schools to the project site are Blue Lake Union Elementary, which is approximately 1.5 miles to the southeast of the project site on the south side of Highway 299, and the Pacific Union School, 4.5 miles southwest in the Arcata School District. The two closest high schools are approximately six to seven miles from the site (Arcata High School and McKinleyville High School, respectively).

There are a variety of recreational facilities within 10 miles of the project site in the City of Blue Lake, City of Arcata, and surrounding unincorporated areas. The closest recreational facilities to the project site include the following:

- Mad River Pump Station 4 Disc Golf Course (0.8 miles to the west)
- Humboldt Bay Municipal Water District Park 1 (1.5 miles to the west)
- Perigot Park and several smaller neighborhood parks in the City of Blue Lake (1.5 miles to the southeast)

Analysis:

a) *Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services - fire protection?*
Less-than-significant Impact.

As noted in the Setting, fire protection services are provided to the project site by the BLFPD and/or the CAL FIRE. The nearest fire station is located in the City of Blue Lake, which is approximately 1.5 miles to the southeast of the project site on the south side of Highway 299.

The proposed project is located on a site that has been used for industrial purposes since the 1950s. The Royal Gold facility has a variety of existing fire suppression infrastructure elements that were historically installed by others when the site was used for lumber milling activity and other industrial uses. The company has maintained and improved some of this infrastructure to meet the needs of its business and comply with current fire code requirements. Royal Gold has also installed several water storage tanks, which are available for fire suppression purposes.

Through the Conditional Use Permit process, the BLFPD has conducted site visits and advised Royal Gold on the following: 1) fire suppression infrastructure in need of inspection and repair; and 2) the required design for the facility access roads to meet fire code

requirements for emergency access. Royal Gold has contracted with Frontier Fire Protection to inspect the fire suppression infrastructure at the site and conduct the needed repairs. Figure 22 – Fire Suppression and Access Map shows the existing infrastructure at the site as well as the designated fire access roads. In their comments on the project, the BLFPD did not indicate that the construction of new fire protection facilities (for example, fire station) would be required in order to serve the project.

As such, the proposed project would not require new or physically-altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

b) *Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services - police protection?*
Less-than-significant Impact.

As noted in the Setting, law enforcement services are provided to the project site by the Humboldt County Sheriff's Department. The nearest sheriff substation is the McKinleyville substation, approximately 6 miles northwest of the project site.

The proposed project is located on a site that has been used for industrial purposes since the 1950s. Since beginning operations at the site in 2009, Royal Gold has installed security fencing, gates, and cameras to keep trespassers off the property due to problems with theft, vandalism, and various other criminal activities, which were prevalent on this vacated mill site prior to the company's use of the site. Most recently, Royal Gold installed chain link security fencing (6-foot height) on the southern portion of the site where the majority of equipment and finished product is stored. This was done to mitigate trespassing, vandalism, and theft at the facility. The proposed project includes installation of additional chain link security fencing (6-foot height) around the remaining areas of the facility where equipment or materials are stored. This is proposed due to continued trespassing, vandalism, and theft in the unsecure portions of the facility. The proposed project also includes installation of security/perimeter lighting around the facility boundary adjacent to existing and proposed security fencing. The issues of trespassing, vandalism, and theft are not unique to the Royal Gold project site and the proposed project includes security fencing, lighting, and cameras to reduce its vulnerability to these crimes. While the proposed project would result in redevelopment of an existing industrial site, it would not substantially increase the need for police protection services to the point that new police protection facilities (for example, police station) would be required in order to serve the project.

As such, the proposed project would not require new or physically-altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for police protection. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

c) *Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services – schools?*
Less-than-significant Impact.

As noted in the Setting, there are several school districts surrounding the unincorporated community of Glendale: Northern Humboldt Union High School District, McKinleyville Union School District, Blue Lake Union Elementary School District, Fieldbrook Elementary School District, and Arcata School District. The closest elementary schools to the project site are Blue Lake Union Elementary, which is approximately 1.5 miles to the southeast of the project site on the south side of Highway 299, and the Pacific Union School, 4.5 miles southwest in the Arcata School District. The two closest high schools are approximately six to seven miles from the site (Arcata High School and McKinleyville High School, respectively).

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The number of employees at full build-out as proposed by this project is estimated to be approximately 65 employees. The project does not propose a land use (for example, housing) that would result in an increase in population and would, therefore, not be expected to result in a significant increase in the number of school-age children within local school districts. Therefore, it is anticipated that the proposed project would have a limited impact on the provision of public education services.

As such, the proposed project would not require new or physically-altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for schools. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

d) *Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services – parks?*
Less-than-significant Impact.

There are a variety of recreational facilities within 10 miles of the project site in the City of Blue Lake, City of Arcata, and surrounding unincorporated areas. The closest recreational facilities to the project site include the following:

- Mad River Pump Station 4 Disc Golf Course (0.8 miles to the west)
- Humboldt Bay Municipal Water District Park 1 (1.5 miles to the west)
- Perigot Park and several smaller neighborhood parks in the City of Blue Lake (1.5 miles to the southeast)

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The number of employees at full build-out as proposed by this project is estimated to be approximately 65 employees. The project does not propose a land use (for example, housing) that would result in an increase in population and would, therefore, not be expected to result in a significant increase in the use of parks in the project area. Therefore, it is anticipated that the proposed project would have a limited impact on the provision of parks and recreational services.

As such, the proposed project would not require new or physically-altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for parks. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

e) *Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services - other public facilities?*
Less-than-significant Impact.

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The number of employees at full build-out as proposed by this project is estimated to be approximately 65 employees. The project does not propose a land use (for example, housing) that would result in an increase in population and would, therefore, not be expected to result in a significant increase in the use of other public facilities. Therefore, it is anticipated that the proposed project would have a limited impact on the provision of public facilities and services.

As such, the proposed project would not require new or physically-altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for other public facilities. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

Mitigation Measures: No mitigation required.

Findings: The project would have a **Less-than-significant Impact** on public services.

3.2.16 Recreation

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located within the Fieldbrook-Glendale Community Services District (FGCSD), which provides water service and wastewater collection services within the Glendale area, but does not maintain any recreational facilities. There are a variety of recreational facilities within 10 miles of the project site in the City of Blue Lake, City of Arcata, and surrounding unincorporated areas. The closest recreational facilities to the project site include the following:

- Mad River Pump Station 4 Disc Golf Course (0.8 miles to the west)
- Humboldt Bay Municipal Water District Park 1 (1.5 miles to the west)
- Perigot Park and several smaller neighborhood parks in the City of Blue Lake (1.5 miles to the southeast)

a) *Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?* **Less-than-significant Impact**.

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The number of employees at full build-out as proposed by this project is estimated to be approximately 65 employees. The project does not propose a land use (for example, housing) that would result in an increase in population and would, therefore, not be expected to result in a significant increase in the use of existing recreational facilities in the project area. Therefore, it is anticipated that the proposed project would have a limited impact and would not cause deterioration of existing recreational facilities.

As such, the proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

b) *Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?*
No Impact.

The proposed project seeks after-the-fact authorization for expanded operations and existing improvements made to the site since Royal Gold began operating its potting soil manufacturing business there in March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of its growing business. The proposed project does not include the development of recreational facilities. The project does not propose a land use (for example, housing) that would result in an increase in population and would, therefore, require the construction or expansion of recreational facilities.

As such, the proposed project would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. Therefore, the proposed project would result in no impact on this category of environmental effect.

Mitigation Measures: No mitigation required.

Findings: The project would have a **Less-than-significant Impact** on recreation.

3.2.17 Transportation

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d) Result in inadequate emergency access?	☐	☐	☒	☐

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. It is located on sixteen separate Assessor's Parcel Numbers (APNs) on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 – Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan).

Road System and Vehicular Access

The existing access road entrance and exits to the facility are located off Glendale Drive (County Road Number 4L765) and are approximately 40-60 feet in width. Glendale Drive is a two-way paved roadway that provides access to commercial, industrial, and rural residential uses in the project area. Glendale Drive would be defined as a Category 4 roadway or better by the Humboldt County Public Works Department since it was built by CalTrans and operated as the old highway prior to the development of the current Highway 299 corridor. The County Public Works Department requires that roads used for truck traffic, such as for surface mining operations, must meet Category 4 road standards in being at least 18 feet in width when two-way traffic is expected. Glendale Drive, in the vicinity of the project site has a 26-foot paved width with two 13-foot lanes and varying 2–6-foot shoulders on both sides.

The primary entrance/exit at the site is in the central southern portion of the facility through APN 516-101-008. There are also two additional exits in the southwestern and southeastern corners of the facility on APNs 516-101-079 and 516-111-062 (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan). Locked gates at the entrances/exits restrict access to the project site.

The main entrance/exit on APN 516-101-008 has a gate approximately 350 feet in from Glendale Drive, the exit on APN 516-111-062 has a gate approximately 70 feet in from Glendale Drive, and the exit on APN 516-101-079 has a gate approximately 80 feet in from Glendale Drive. These entrances/exits are paved more than 50 feet in length and 24 feet in width, which meets the County's design standard for paved aprons.

Materials are imported to the site and the soil and fertilizer products are exported from the site using these entrance/exits to access Glendale Drive and then Highway 299, which is less than 500 feet from the project site (see Figure 6 – Site Plan).

Alternative Modes

There is currently limited infrastructure for alternative modes in the unincorporated community of Glendale.

Pedestrian and Bicycle Facilities:
There are currently no pedestrian or bicycle facilities in the community of Glendale.

As described in several planning documents prepared by the Humboldt County Association of Governments, it is proposed to develop a Class I multi-use trail between Arcata and Blue Lake referred to as the Annie & Mary Rail Trail. The Annie & Mary Rail Trail is a collaborative effort between Humboldt County, City of Blue Lake, City of Arcata, Caltrans, Humboldt County Association of Governments (HCAOG), Blue Lake Rancheria, Redwood Community Action Agency, and Friends of the Annie & Mary Rail Trail to develop a network of bicycle and pedestrian facilities between Arcata and Blue Lake. The majority of the trail would be developed within the railroad right-of-way for the former Arcata & Mad River Railroad Company. However, portions may occur within the Caltrans right-of-way along Highway 299 or the County road right-of-way, where use of the railroad right-of-way would be prohibitive or present public safety concerns. The City of Blue Lake recently constructed the first portion of the trail from Chartin Road to Hatchery Road. The County is currently in the process of seeking funding for the next phase of the project, which would connect Blue Lake to Glendale.

Transit:
The Blue Lake Rancheria Transit System (BLRTS) is the only transit service provider available in the community of Glendale. The BLRTS serves riders throughout the greater communities of Blue Lake, Arcata, McKinleyville, and Eureka. BLRTS operates between 7:00 a.m. and 6:00 p.m. on weekdays, providing 16 trips per day and provides over 1,300 trips per month. The BLRTS serves two transit stops on the Rancheria, seven stops within the City of Blue Lake, one stop at Glendale, and several flag stops are also available along the route. BLRTS buses are equipped with Americans with Disabilities Act (ADA) wheelchair lifts and to also carry bicycles, enabling multimodal transportation opportunities. The Rancheria manufactures biodiesel to fuel its public transit buses, using waste oil from its kitchens (Blue Lake Rancheria, 2021). The closest bus stop to the project site is located at Murphy's Market, which is directly adjacent to the main entrance/exit to the site.

Analysis:

a) *Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?*
Less-than-significant Impact.

Construction
Construction traffic for the project would result in a minor, short-term increase in construction-related vehicle trips on Glendale Drive, Highway 299, and other local roadways. Construction would result in vehicle/truck trips by construction workers and haul-truck trips for delivery and disposal of construction materials to and from construction areas. Since construction of the proposed improvements would be temporary, construction activities would not be expected to conflict with a program, plan, ordinance, or policy addressing the local roadway system or transit, bike, and pedestrian facilities.

Operation
At full build-out of the Royal Gold facility as proposed by this project, it is estimated that average truck traffic generated by the operation will be approximately 60 trips per day (30 in/30 out). During periods of peak use, maximum truck traffic could be 10 truck trips per hour (5 in/5 out); however, there will be long periods with little or no project-generated traffic. These numbers take into consideration materials being imported to the site and materials being exported from the site. At full build-out, employees will generate approximately 130 vehicle trips per day (65 in/65 out). On average, full build-out of the Royal Gold facility will generate a total of approximately 190 vehicle/truck trips per day (95 in/95 out). Royal Gold distributes all of its product through distributors and contract haulers.

Vehicular Access:
The project site is accessed from Glendale Drive and is approximately 500 feet from Highway 299. Glendale Drive would be defined as a Category 4 roadway or better by the Humboldt County Public Works Department due to the fact that it was built by CalTrans and operated as the old highway prior to the development of the current Highway 299 corridor. Humboldt County Public Works Department requires that roads used for truck traffic, such as for surface mining operations, must meet Category 4 road standards in being at least 18 feet in width when two-way traffic is expected. Glendale Drive, in the vicinity of the project site, has a 26-foot paved width with two 13-foot lanes and varying 2–6-foot shoulders on both sides. Additionally, the entrances/exits at the site are paved more than 50 feet in length and 24 feet in width, which meets the County's design standard for paved aprons.

The Royal Gold facility is located on a site previously used for lumber mill operations, which was designed to accommodate industrial truck traffic, and is located along the original highway through the Mad River Valley. Since the access roads to and from the project site have been used successfully for past industrial uses since the 1950s, it is not anticipated that the continued use of the site for industrial use would conflict with a program, plan, ordinance, or policy addressing the local roadway system.

The referral response received from the Humboldt County Department of Public Works on April 26, 2021 did not express any concerns about the existing roadway system in the project

area or access to the project site. However, the comments did express concerns about employees backing into the County road right-of-way when exiting the site. The Department recommended the placement of pavement markings for the parking area on the western edge of APN 516-101-079 (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan). The Department noted that this issue could be addressed at an onsite meeting after project approval. The requirements of the County Department of Public Works will be included as a condition of approval for the project.

Pedestrian and Bicycle Facilities:
As discussed in the Setting, there are currently no pedestrian or bicycle facilities in the community of Glendale. However, it is proposed to develop a Class I multi-use trail between Arcata and Blue Lake referred to as the Annie & Mary Rail Trail. The majority of the trail would be developed within the railroad right-of-way for the former Arcata & Mad River Railroad Company. However, portions may occur within the Caltrans right-of-way along Highway 299 or the County road right-of-way where use of the railroad right-of-way would be prohibitive or present public safety concerns. A portion of the railroad right-of-way runs through the southern portion of the project site and is currently used by Royal Gold as part of the access road for the soil operation (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan). There are several properties containing industrial uses between Glendale and Blue Lake that also contain a portion of the railroad right-of-way. Development of the trail through these existing industrial sites would potentially cause land use conflicts as well as public safety issues. For this reason, the current design for the segment of the Annie & Mary Rail Trail between Blue Lake and Glendale is proposed to occur within the Caltrans right-of-way along Highway 299 and a portion of the County road right-of-way (Humboldt County, 2018). As such, continued use of the railroad right-of-way running through the Royal Gold site would not conflict with plans for the development of the Annie & Mary Rail Trail. Once constructed, the trail would provide pedestrian and bicycle access to the project site and connect the community of Glendale to the regional trail system in the Humboldt Bay area.

Transit:
As discussed in the Setting, the BLRTS is the only transit service provider available in the community of Glendale. The BLRTS serves riders throughout the greater communities of Blue Lake, Arcata, McKinleyville, and Eureka. BLRTS operates between 7:00 a.m. and 6:00 p.m. on weekdays, providing 16 trips per day and provides over 1,300 trips per month. The BLRTS serves two transit stops on the Rancheria, seven stops within the City of Blue Lake, one stop at Glendale, and several flag stops are also available along the route. The closest bus stop to the project site is located at Murphy's Market, which is directly adjacent to the main entrance/exit to the site. The proximity of the BLRTS bus stop to the Royal Gold facility provides the opportunity for employees to use transit to commute to and from work. The use of the BLRTS for commuting is desired and consistent with programs, plans, or policies related to transit facilities.

Therefore, the proposed project will not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

b) *Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?*
Less-than-significant Impact.

The amended CEQA Guidelines (Section 15064.3) have replaced level of service (LOS) with vehicle miles traveled (VMT) as the most appropriate measure of a project's transportation impacts. For a land use project, VMT exceeding an applicable threshold of significance may indicate a significant impact. At this time, Humboldt County has not adopted thresholds to determine VMT impacts as a result of land use projects. If existing models or methods are not available to estimate VMT for the project being considered, a lead agency may analyze the project's VMT qualitatively (CEQA Guidelines Section 15064.3[b][3]). Due to the absence of existing models or methods for analyzing VMT impacts in Humboldt County, this section includes a qualitative analysis of VMT impacts from the proposed project.

Construction
Construction traffic for the project would result in a minor, short-term increase in construction-related vehicle trips on Glendale Drive, Highway 299, and other local roadways. Construction would result in vehicle/truck trips by construction workers and haul-truck trips for delivery and disposal of construction materials to and from construction areas. Since construction of the proposed improvements would be temporary, construction activities would not be expected to result in significant impacts related to VMT.

Operation
As described above under subsection a), the Royal Gold facility will generate a total of approximately 190 vehicle/truck trips per day (95 in/95 out) at full build-out. This includes approximately 60 trips per day from truck traffic and approximately 130 trips per day from employee vehicles. This level of daily traffic is equivalent to approximately 21 single-family residences (estimated 9 daily trips per residential unit) and is not generally considered to be a substantial amount of traffic. The proposed project is not expected to result in significant impacts related to VMT for the following reasons:

- The proposed project would be located on an infill development site within 500 feet of Highway 299 in an existing developed area containing a mixture of commercial, industrial, and residential uses.
- The location of an industrial operation on a historic industrial site near the population centers in the Humboldt Bay area has the potential to reduce VMT from employees that would have traveled longer distances for similar employment opportunities.
- The project provides a local source of soil material for agricultural operations in Humboldt County that reduces the need for the import of soil into the County.
- The manufacture of soil at the Royal Gold facility involves the reuse and recycling of by-products (for example, sawdust), which reduces the transport of materials to landfills or for other uses outside of the County.
- Transit service provided by the Blue Lake Rancheria Transit System is available for Royal Gold employees. The closest bus stop is located at Murphy's Market, directly adjacent to the main entrance/exit to the project site.

- Future multi-modal transportation projects (for example, Annie & Mary Rail Trail) would provide pedestrian and bicycle access to the project site and connect the community of Glendale to the regional trail system in the Humboldt Bay area.

Therefore, based on the project design and location, the proposed project will not conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b). Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

c) *Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g. for example, farm equipment)?*
Less-than-significant Impact.

The proposed project does not involve the development of any transportation improvements that have the potential to increase hazards or incompatible uses. The project site is accessed from Glendale Drive and is approximately 500 feet from Highway 299. The Royal Gold facility is located on a site previously used for lumber mill operations, which was designed to accommodate industrial truck traffic, and is located along the original highway through the Mad River Valley. Stopping sight distance is adequate at the entrance and exits to the project site. Although there are agricultural operations located in the Mad River Valley, there is not the consistent transport of farm equipment in the vicinity of the project site that would be incompatible with the proposed industrial activity. Since the access roads to and from the project site have been used successfully for past industrial uses since the 1950s, the project will not substantially increase hazards due to design features or incompatible uses.

The referral response received from the Humboldt County Department of Public Works on April 26, 2021 did not express any concerns about the existing roadway system in the project area or access to the project site. Therefore, based on the project design and location, the proposed project would not substantially increase hazards due to a geometric design feature (for example, sharp curves or dangerous intersections) or incompatible uses (for example, farm equipment). Therefore, the proposed project would result in a less-than-significant on this category of environmental effect.

d) *Result in inadequate emergency access?*
Less-than-significant Impact.

The Royal Gold facility is located on a site previously used for lumber mill operations, which was designed to accommodate industrial truck traffic, and is located along the original highway through the Mad River Valley. Furthermore, the project site's proximity to Highway 299 (approximately 500 feet) provides adequate access and response to the site in an emergency situation.

Through the Conditional Use Permit process, the Blue Lake Fire Protection District (BLFPD) has conducted site visits and advised Royal Gold on the required design for the facility access roads to meet fire code requirements for emergency access. This includes installing a Knox Lock or other similar rapid entry system on the main entrance gate to allow the BLFPD and other emergency responders to have access to the site in case of an emergency (e.g., fire,

medical emergency, etc.). Figure 22 – Fire Suppressions and Access Map shows the location of the designated fire access roads at the project site, which Royal Gold has improved and maintained to comply with emergency access standards.

In addition, the project is required to comply with Chapter 10 (Fire Safe Regulations) of the Humboldt County Code, which requires that private roadways and access driveways be designed to meet the Category 4 road standards and other emergency access standards. The Fire Safe Regulations provide specific standards for roads providing ingress and egress for emergency vehicles and evacuation concurrently and signing of streets and buildings.

Based on the location and design of the project site, and compliance with emergency access standards, the proposed project is not expected to result in inadequate emergency access. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

Mitigation Measures: No mitigation required.

Findings: The project would have a **Less-than-significant Impact** on Transportation.

3.2.18 Tribal Cultural Resources

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register or historical resources as defined in Public Resources Code Section 5020.1(k)?	☐	☒	☐	☐
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth In subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

Archaeological and other resources can be damaged through uncontrolled public disclosure. Archeological site locations and culturally-sensitive information is considered confidential and public access to such information is restricted by State and federal law, therefore this information has been redacted for use in the Mitigated Negative Declaration (MND). Professionally-qualified individuals, as determined by the California Office of Historic Preservation, may contact the lead agency in order to inquire about its availability.

Information regarding the location, character, or ownership of a historic resource is exempt from the Freedom of Information Act pursuant to 16 U.S.C. 470w-3 (National Historic Preservation Act) and 16 U.S.C. § 470hh (Archaeological Resources Protection Act) and California State Government Code, Section 6254.10.

Environmental Setting:

AB 52 was enacted on July 1, 2015 and establishes that "*a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment*" (Public Resources Code Section 21084.2). It further states that the lead agency shall establish measures to avoid impacts that would alter the significant characteristics of a tribal cultural resource when feasible (PRC Section 21084.3).

Public Resources Code Section 21074 (a)(1)(A) and (B) defines tribal cultural resources as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" and meets either of the following criteria:

- Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying these criteria, the lead agency shall consider

the significance of the resource to a California Native American tribe.

AB 52 also establishes a formal consultation process for California cities, counties, and Tribes regarding tribal cultural resources. Under AB 52, lead agencies are required to "*begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project*." Native American tribes to be included in the process are those that have requested notice of projects proposed within the jurisdiction of the lead agency.

The purpose of the consultation is to determine whether a proposed project may result in a significant impact to tribal cultural resources that may be undocumented or known only to the Tribe and its members. As set forth in PRC Section 21080.3.1(b), the law requires:

> *"Prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report for a project, the lead agency shall begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project if: (1) the California Native American tribe requested to the lead agency, in writing, to be informed by the lead agency through formal notification of proposed projects in the geographic area that is traditionally and culturally affiliated with the tribe, and (2) the California Native American tribe responds, in writing, within 30 days of receipt of the formal notification, and requests the consultation."*

The project is within the traditional territory of the Patawat division of the Wiyot Tribe. This group controlled the lands from Little River to south of the Mad River, while two other divisions of the tribe inhabited areas farther south and east (WRA, 2014). The project site is located on an existing industrial site that has been used for industrial purposes since the 1950s.

In 2014, an Archaeological Survey Report was prepared that covered the facility footprint at that time, which was approximately 14 acres (WRA, 2014). The project area setting was found to be relatively disturbed with much of the ground surface disrupted and displaced. The historic uses of the property included a mill operation for over 50 years with terraced log decks, ponds, roadways, and buildings. Much of the surface was covered with paving and compacted gravel. During the investigation, no cultural resources were identified at the project site.

In 2021, an Addendum to the 2014 Archaeological Survey Report was prepared (WRA, 2021). The 2021 field investigation included approximately 30 acres, which coupled with the 2014 survey, brought the total survey coverage for the Royal Gold project site to 44 acres. The previous records search conducted in 2014 was utilized and combined with a current updated record search for the entire project area. The conclusions and recommendations in the Report stated the following (WRA, 2021):

> "*This report concludes that the proposed project activities will not cause significant impacts to historical resources because no cultural resources that would qualify under CEQA (15064.5(a)) are present. Due to the substantial ground disturbances that have taken place over the property, it would be unlikely that intact buried archaeological deposits exist. However, as per tribal coordination and standard archaeological practice, an inadvertent discovery protocol was provided in the instance cultural resources are uncovered during project activities*."

For the 2021 Addendum, WRA re-contacted tribal representatives from the Blue Lake Rancheria, Wiyot Tribe, and Bear River Band of the Rohnerville Rancheria on March 20, 2021. Janet Eidsness, Tribal Historic Preservation Officer (THPO) of the Blue Lake Rancheria, responded via email on March 22, 2021 noting the high level of disturbance at the property and asking that an inadvertent archaeological discovery protocol be a final recommendation for the project moving forward. Wiyot Tribal Chairman, Ted Hernandez responded on March 23, 2021 indicating he concurred with Ms. Eidsness. No other responses were received (WRA, 2021).

As required by AB 52, on April 1, 2021, invitations for formal consultation were sent to the Tribal Historic Preservation Officers (THPOs) for the Wiyot Tribe, Blue Lake Rancheria, and the Bear River Band of the Rohnerville Rancheria. The Blue Lake Rancheria and the Wiyot Tribe THPOs responded and recommended that an inadvertent archaeological discovery protocol be made a project condition (Eidsness, 2021; Hernandez, 2021).

Analysis:

a) *Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register or historical resources as defined in Public Resources Code Section 5020.1(k)?*
Less-than-significant with Mitigation Incorporated.

As required by AB 52, Humboldt County sent requests for formal consultation on April 1, 2021 to the THPOs for the Wiyot Tribe, Blue Lake Rancheria, and the Bear River Band of the Rohnerville Rancheria. The Blue Lake Rancheria and the Wiyot Tribe THPOs responded and recommended that an inadvertent archaeological discovery protocol be made a project condition (Eidsness, 2021; Hernandez, 2021). No request to initiate consultation under the provisions of AB 52 was received from the Tribes. As discussed in the Setting, the 2014 and 2021 Archaeological Survey Reports did not identify any prehistoric or historic archaeological sites, ethnographic sites, or historic-era built environment resources on the project site (WRA, 2014; WRA, 2021). As such, the project site is not known to contain a tribal cultural resource that is listed or eligible for listing in the California Register of Historical Resources, or in a local register or historical resources as defined in Public Resources Code Section 5020.1(k).

However, there remains the possibility that tribal cultural resources could exist at the project site and may be uncovered during project development. To prevent potential impacts to unknown tribal cultural resources at the project site, an inadvertent discovery protocol has been included as Mitigation Measure CR-1 for the proposed project (see Section 3.2.5 – Cultural Resources). With the proposed mitigation measure, the project will not cause a substantial adverse change in the significance of a tribal cultural resource. Therefore, the proposed project would result in a less-than-significant impact with mitigation incorporated on this category of environmental effect.

b) *Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth In subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.*

Less-than-significant with Mitigation Incorporated.

As discussed in the Setting, the project site is located on an existing industrial site that has been used for industrial purposes since the 1950s. Results from the 2014 and 2021 Archaeological Survey Reports did not identify any prehistoric or historic archaeological sites, ethnographic sites, or historic-era built environment resources on the project site (WRA, 2014; WRA, 2021).

As required by AB 52, Humboldt County sent requests for formal consultation on April 1, 2021 to the THPOs for the Wiyot Tribe, Blue Lake Rancheria, and the Bear River Band of the Rohnerville Rancheria. The Blue Lake Rancheria and the Wiyot Tribe THPOs responded and recommended that an inadvertent archaeological discovery protocol be made a project condition (Eidsness, 2021; Hernandez, 2021). No request to initiate consultation under the provisions of AB 52 was received from the Tribes.

Based on the above information, Humboldt County (as lead agency) has determined that there are no known tribal cultural resources present on the project site that are considered significant to a California Native American Tribe. However, there remains the possibility that tribal cultural resources could exist at the project site and may be uncovered during project development. To prevent potential impacts to unknown tribal cultural resources at the project site, an inadvertent discovery protocol is included as Mitigation Measure CR-1 for the proposed project (see Section 3.2.5 – Cultural Resources).

With the proposed mitigation measure, the proposed project will not cause a substantial adverse change in the significance of a tribal cultural resource. Therefore, the proposed project would result in a less-than-significant impact with mitigation incorporated on this category of environmental effect.

Mitigation Measures: Same as the following Mitigation Measures:

CR-1. Inadvertent Discovery (see Section 3.2.5 – Cultural Resources)

Findings: The project would have a **Less-than-significant Impact with Mitigation Incorporated** on tribal cultural resources.

3.2.19 Utilities and Service Systems

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☒	☐	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. It is located on sixteen separate APNs on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 – Ownership and Size of Project Parcels). The facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – Assessor Parcel Numbers and Figure 6 – Site Plan).

Water

Fieldbrook-Glendale Community Service District (FGCSD) provides water service to the project site. FGCSD buys water from the Humboldt Bay Municipal Water District (HBMWD), which is piped from its original source – subsurface wells on the Mad River upstream of the City of Arcata. FGCSD's website states that according to 2014 HBMWD records, FGCSD's average daily use was 159,000 gallons per day (gpd) and peak daily use was 240,000 gpd. Availability of connections within the FGCSD water system is not limited by source, but by FGCSD's contract with the HBMWD (430,000 million gpd). As such, the HBMWD has sufficient water supply to meet FGCSD's demands (FGCSD, 2021), and FGCSD has sufficient water supply to meet the demands of the proposed project.

Wastewater

Wastewater collection is provided to the project site by the FGCSD, which contracts with the City of Arcata for sanitary sewer treatment and disposal. The FGCSD designates the company as a Significant Industrial User and has issued Royal Gold a Wastewater Discharge Permit (#2020-01) authorizing discharges of industrial wastewater (FGCSD, 2020). The Permit has discharge standards, flow limitations, and monitoring, sampling, and reporting requirements. Wastewater being discharged to the sewers is primarily runoff from coco fiber hydration with a minimal contribution from existing bathroom facilities at the site. The industrial wastewater is stored in tanks to lower the discharge rate and allow wastewater to be discharged continuously, seven days per week instead of only when the process water is running off from the coco hydration system. Onsite pretreatment of industrial wastewater involves the use of collection tanks which act as passive sediment traps as well as removal of sediment from the effluent through a vibratory separator. Other than the outflow from the coco hydration, the only other connections to the sewer are two toilets and two sinks (FGCSD, 2020). The company also has portable chemical toilets on site that are maintained and serviced by a sanitary service provider.

Stormwater

As part of past industrial use of the project site, numerous stormwater features were historically constructed (by others) that discharge to the Mad River. Numerous stormwater improvements have also been constructed by Royal Gold throughout the site to comply with the requirements of the State Water Resources Control Board (SWRCB) Industrial General Permit (IGP) and the settlement agreement with Humboldt Baykeeper (see Section 2.2.3 – Historical Use/Environmental Baseline/Existing Condition). Existing stormwater management features at the project site are identified in the current Stormwater Pollution Prevention Plan (SWPPP) (see Appendix 5.9; SHN, 2021c) and include, but are not limited to, detention basins, bioswales, lined ditches, floating treatment islands, sediment traps, gravel bags, check dams, fiber media socks, drainage ditches, drainage inlets, culverts, and stormwater piping. See Figure 13 – SWPPP BMP Location Map, which shows the existing stormwater management features at the site and the ten locations of stormwater discharge from the site. Also, Royal Gold has constructed several buildings which now cover materials storage and processing areas such as Building A, Building B, and the addition to the amendment storage building. These stormwater management improvements have resulted in significant reductions in the pollutant concentrations detected in stormwater discharging from the facility.

Currently, stormwater discharge from the western portion of the project site flows to the southwest into roadside drainage ditches along Glendale Drive that discharge to the Mad River. Stormwater discharges from the central and eastern portions of the site flow to the south through a series of stormwater drainage ditches and culverts on adjacent private property, which discharge into Hall Creek and ultimately the Mad River. Stormwater discharge from the northwestern corner of the facility flows to the north through a bioswale into a vegetated buffer. See Figure 23 – Drainage Connectivity Map, which shows how stormwater runoff from the project site flows to Hall Creek and the Mad River.

Electricity and Gas

The Royal Gold facility receives electricity from the Redwood Coast Energy Authority (RCEA) Community Choice Energy (CCE) program and gas service from PG&E. The electricity and gas are distributed and delivered over the existing utility lines operated by PG&E (RCEA, 2021a)

Solid Waste

Solid waste disposal is provided by Recology, which includes recycling services. Additionally, the manufacture of soil at the Royal Gold facility involves reuse and recycling of by-products (for example, sawdust), which reduces landfill disposal.

Analysis:

a) *Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?*
Less-than-significant with Mitigation Incorporated.

The project site is located within the unincorporated community of Glendale and is currently served by existing water, wastewater, electrical, gas, and telecommunication facilities. As discussed in Section 2.3 – Project Description, installation of utility infrastructure (for example, electricity, water, etc.) is proposed to serve the new buildings at the site that were constructed after the Conditional Use Permit approval in August 2016. Utility infrastructure is also proposed to be extended to proposed Buildings C, D, E, and F (Figure 6 – Site Plan). Most of the existing/proposed buildings without utilities would receive electricity and water service connections; however, it is also proposed to extend sewer and telecommunication service to Building F for the proposed bathrooms and office space. Additionally, Royal Gold is proposing stormwater improvements to manage the increase in stormwater runoff from the new impervious surfaces proposed in the northeastern portion of the site (for example, Building D and additional paving). The stormwater improvements would include the conversion of wetlands in the central eastern portion of the site into stormwater detention basins and stormwater swales.

The infrastructure improvements proposed by the project would result in physical impacts to the project site, which have been previously analyzed under the appropriate resource sections of this document. The project has been designed and mitigated to reduce construction and operational impacts to less than significant. Mitigation was required for the proposed project as discussed in the following resource sections of this document:

- Aesthetics (Section 3.2.1)
- Air Quality (Section 3.2.3)
- Biological Resources (Section 3.2.4)
- Cultural Resources (Section 3.2.5)
- Energy (Section 3.2.6)
- Hazards and Hazardous Materials (Section 3.2.9)

- Hydrology and Water Quality (Section 3.2.10)
- Noise (Section 3.2.13)

No additional mitigation measures beyond those already identified would be required for the proposed project.

Therefore, the proposed projects as designed and mitigated, would not cause significant environmental effects from the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities. Therefore, the proposed project would result in a less-than-significant impact with mitigation incorporated.

b) *Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?*
Less-than-significant Impact.

FGCSD provides water service to the project site. FGCSD buys water from the HBMWD, which is piped from its original source – subsurface wells on the Mad River upstream of the City of Arcata. FGCSD's website states that according to 2014 HBMWD records, FGCSD's average daily use was 159,000 gpd and peak daily use was 240,000 gpd. Availability of connections within the FGCSD water system is not limited by source, but by FGCSD's contract with the HBMWD (430,000 million gpd). As such, the HBMWD has sufficient water supply to meet FGCSD's demands (FGCSD, 2021), and FGCSD has sufficient water supply to meet the demands of the proposed project.

Therefore, the proposed project would have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years. Therefore, proposed project would result in a less-than-significant impact on this category of environmental effect.

c) *Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?*
Less-than-significant Impact.

As discussed in the Setting, wastewater collection is provided to the project site by the FGCSD who contracts with the City of Arcata for sanitary sewer treatment and disposal. The FGCSD designates the company as a Significant Industrial User and has issued Royal Gold a Wastewater Discharge Permit (#2020-01) authorizing discharges of industrial wastewater (FGCSD, 2020). The Permit has discharge standards, flow limitations, and monitoring, sampling, and reporting requirements. Wastewater being discharged to the sewer system is primarily runoff from coco fiber hydration with a minimal contribution from existing bathroom facilities at the site. The industrial wastewater is stored in tanks to lower the discharge rate and allow wastewater to be discharged continuously, seven days per week instead of only when the process water is running off from the coco hydration system. Onsite pretreatment of industrial wastewater involves the use of collection tanks, which act as passive sediment traps as well as removal of sediment from the effluent through a vibratory

separator. Other than the outflow from the coco hydration, the only other connections to the sewer are two toilets and two sinks (FGCSD, 2020). The company fulfills the requirements of the Wastewater Discharge Permit, so its wastewater discharge does not adversely affect the City's wastewater treatment facility.

The project proposes to add bathroom facilities in proposed Building F, which would result in additional domestic type wastewater. All bathroom facilities would be connected to the FGCSD wastewater collection system and subject to the requirements of the facilities Wastewater Discharge Permit and any applicable pretreatment regulations (for example, 40 CFR 403 and FGCSD Ordinance No. 90-2). The increase in wastewater discharge from the proposed bathrooms would be minimal relative to the maximum daily flow rate of process wastewater that is currently allowed for the facility. In compliance with the requirements of the Wastewater Discharge Permit (#2020-01) and other applicable laws and regulations, FGCSD and the City of Arcata would have adequate capacity for the incremental increase in wastewater discharge from the proposed project.

Therefore, the proposed project would not result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

d) *Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?* **Less-than-significant Impact.**

The proposed project would generate solid waste during both construction and operation. Disposal of waste materials generated during project construction and operation will be required to comply with applicable federal, state, and local regulations.

Construction and operational waste with no practical reuse or that cannot be salvaged or recycled would be legally disposed of at a local transfer station. During project operations, solid waste disposal would be provided by Recology, which includes recycling services. It is also noted that the manufacture of soil at this site involves reuse and recycling of by-products (for example, sawdust), which reduces landfill disposal and provides an alternative from energy-intensive manufacturing of chemical fertilizers.

Active permitted in-County transfer stations include the Humboldt Waste Management Authority facility in Eureka, California and the Recology Eel River Transfer Station in Fortuna, California. Solid waste generated by the project would represent a small fraction of the daily permitted tonnage of these facilities. Waste would ultimately be transferred to State licensed landfills located outside of Humboldt County, which have adequate permitted capacity (for example, Anderson Landfill, Potrero Landfill, Dry Creek Landfill, etc.). The closest landfill to the project site is the Anderson Landfill in Anderson, CA. The Anderson Landfill has the existing capacity of 10,409,132 cubic yards and is permitted to receive a maximum of 1,850 tons of solid waste per day. It is estimated that operation of the Anderson Landfill will cease in January 2093 (CalRecycle, 2021). Therefore, existing solid waste disposal facilities have adequate capacity to serve the proposed project.

Therefore, the proposed project would not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

e) *Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?*
Less-than-significant Impact.

The California Integrated Waste Management Act of 1989 (Public Resources Code Division 30), enacted through Assembly Bill (AB) 939 and modified by subsequent legislation, required all California cities and counties to implement programs to divert waste from landfills (Public Resources Code Section 41780). Compliance with AB 939 is determined by the California Department of Resources, Recycling, and Recovery (CalRecycle).

The construction and operational activities from the proposed project would be required to comply with all federal, State, and local statutes related to solid waste, including AB 939. This would include compliance with recycling, hazardous waste, and composting programs in the County to comply with AB 939. It is also noted that the manufacture of soil at this site involves reuse and recycling of by-products (for example, sawdust), which reduces landfill disposal and provides an alternative from energy-intensive manufacturing of chemical fertilizers.

State law (SB 1018) mandates recycling for all businesses that generate four or more cubic yards of solid waste per week. The proposed project is required to provide adequate areas for collecting and loading recyclable materials where solid waste is collected. As discussed under subsection d) above, solid waste disposal is provided to the Royal Gold facility by Recology, which includes recycling services.

Therefore, the proposed project would comply with federal, state, and local management and reduction statutes and regulations related to solid waste. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

Mitigation Measures: Same as the following Mitigation Measures related to construction and long-term maintenance related impacts:

AQ-1. **Facility Dust Mitigation and Housekeeping Plan** (see Section 3.2.3 – Air Quality)

BR-1. **Wetland Mitigation** (see Section 3.2.4 – Biological Resources)

BR-2. **Habitat Enhancements for Encroachment into Streamside Management Areas (SMAs)** (see Section 3.2.4 – Biological Resources)

BR-3. **Seasonal Restrictions on Maintenance of Stormwater Detention Basins** (see Section 3.2.4 – Biological Resources)

BR-4. **Special-status Amphibian Surveys** (see Section 3.2.4 – Biological Resources)

BR-5. **Annual Detention Basin Maintenance Protocol** (see Section 3.2.4 – Biological Resources)

BR-6. **Nesting Bird Surveys** (see Section 3.2.4 – Biological Resources)

CR-1. **Inadvertent Discovery** (see Section 3.2.5 – Cultural Resources)

CR-2. **Human Remains** (see Section 3.2.5 – Cultural Resources)

HHM-1. **Soil and Groundwater Management Plan** (see Section 3.2.10 – Hydrology and Water Quality)

NO-1. **Construction Noise Limitations** (see Section 3.2.13 – Noise)

Findings: The project would have a **Less-than-significant Impact with Mitigation Incorporated** on Utilities and Service Systems.

3.2.20 Wildfire

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

Environmental Setting:

Fire protection in Humboldt County is provided by local districts, cities, and the California Department of Forestry and Fire Protection (CAL FIRE). The project site is located in a State Responsibility Area (SRA), which are identified as areas within the State in which CAL FIRE assumes primary financial responsibility for preventing and suppressing fires. The project site is also within the Blue Lake Fire Protection District (BLFPD). The closest fire station to the project site is the BLFPD main station, which is approximately 1.6 miles to the southeast of the project site on the south side of Highway 299.

CAL FIRE designates Fire Hazard Severity Zones (FHSZs) based on factors such as fuel, slope, and fire weather with varying degrees of fire hazard (such as, moderate, high, and very high). While FHSZs do not predict when or where a wildfire will occur, they do identify areas where wildfire hazards could be more severe and therefore are of greater concern. According to CAL FIRE, the project site and surrounding developed area are located in a FHSZ classified as "moderate." The forested hillsides surrounding the Mad River Valley are classified as a "high" FHSZ (CAL FIRE, 2021).

The climate in the project area is moderate with the predominant weather factor being moist air masses from the ocean. Average annual rainfall in the project area is approximately 50 to 55 inches with the majority falling between October and April (WRCC, 2021). The North Coast Air Basin (NCAB) enjoys some of the best air quality in State, which is aided by winds off the ocean. Predominant wind direction is typically from the northwest during summer months and from the southwest during storm events occurring during winter months.

When Royal Gold moved to the site in 2009, it contained remnants of the former industrial uses, including asphalt and concrete pavement, buildings, compacted gravel surfaces, constructed stormwater management features, fencing, and utility infrastructure. The majority of the improvements on the site in 2009 were in the southern portion of the site. The northern portion of

the site contained compacted gravel surfaces and graded and compacted soils that were historically used for log storage (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date] and Figure 5 - Project Site in Baseline Year [2009]).

Elevations at the project site range from approximately 90 feet above sea level in the south to approximately 125 feet in the north. Due to the developed nature of the project site, vegetation primarily exists along the exterior property boundaries. The limited vegetation within the site primarily occurs within and surrounding stormwater management features (e.g., detention basins, bioswales, etc.). Land uses surrounding the project site are a combination of commercial, industrial, and rural residential uses (see Figure 2 – Project Area). In their current condition, the project site and its immediate surroundings do not meet the definition of a wildland, as historical development has significantly reduced the amount of natural vegetation and fuels.

Regulatory Setting:

Humboldt County Community Wildfire Protection Plan

In 2006, the Humboldt County Board of Supervisors approved a Master Fire Protection Plan (MFPP), as a resource to assist in the development of appropriate policies in the General Plan. The MFPP was updated in 2013 as the Humboldt County Community Wildfire Protection Plan (CWPP). The most recent update to the CWPP was in 2019. The CWPP serves as a framework for fire coordination, prevention, and protection throughout the county. According to the CWPP, the project site is located within the Humboldt Bay Area Planning Unit (Unit 8). Evacuees from this area would utilize Glendale Drive or Highway 299, and travel east or west depending on fire behavior, wind patterns, traffic, and ingress of emergency vehicles. The Humboldt County Sheriff and Emergency Officials will use the Humboldt Alert mass communication system and door-to-door methods to inform residents about the threat of wildfire and the circumstantial evacuation route (Humboldt County, 2019).

Analysis:

a) *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?*
Less-than-significant Impact.

As discussed in the Setting, the project site is within an SRA and is located within a FHSZ classified as "moderate" (CAL FIRE, 2021). According to the Humboldt County CWPP, the project site is located within the Humboldt Bay Area Planning Unit (Unit 8). Evacuees from this area would utilize Glendale Drive or Highway 299, and travel east or west depending on fire behavior, wind patterns, traffic, and ingress of emergency vehicles. The Humboldt County Sheriff and Emergency Officials will use the Humboldt Alert mass communication system and door-to-door methods to inform residents about the threat of wildfire and the circumstantial evacuation route (Humboldt County, 2019).

The proposed project is not of the nature to physically interfere with emergency response or emergency evacuation. The Royal Gold facility is located on a site previously used for lumber mill operations, which was designed to accommodate industrial truck traffic, and is

located along the original highway through the Mad River Valley. Furthermore, the project site's proximity to Highway 299 (approximately 500 feet) provides adequate access and response to the site in an emergency situation. Through the Conditional Use Permit process, the BLFPD has conducted site visits and advised Royal Gold on the required design for the facility access roads to meet fire code requirements for emergency access. This includes installing a Knox Lock or other similar rapid entry system on the main entrance gate to allow the BLFPD and other emergency responders to have access to the site in case of an emergency (e.g., fire, medical emergency, etc.). Figure 22 – Fire Suppressions and Access Map shows the location of the designated fire access roads at the project site, which Royal Gold has improved and maintained to comply with emergency access standards. Based on the location and design of the project site, and compliance with emergency access standards, the proposed project is not expected to interfere with emergency response or evacuation in the project area.

Therefore, the proposed project would not substantially impair an adopted emergency response plan or emergency evacuation plan. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

b) *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?*
Less-than-significant Impact.

As discussed in the Setting, the project site is within a FHSZ that is classified as "moderate" (CAL FIRE, 2021). Although, the forested hillsides surrounding the Mad River Valley are classified as a "high" FHSZ, the developed condition of the project site and proposed activities would not exacerbate wildfire risks. The project site's proximity to forestland areas could expose employees to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire, but these hazards would not be substantially different than that for other types of land uses in the project area.

The project site is located within 500 feet of Highway 299 and is surrounded by rural residential development and timberland to the north, rural residential and industrial uses to the east, commercial uses, industrial uses, rural residential uses to the south, and rural residential uses to the west. The Royal Gold facility is relatively flat and slopes generally to the south. Elevations at the project site range from approximately 90 feet above sea level in the south to approximately 125 feet in the north. Most of the site contains paved or compacted gravel surfaces with limited vegetation, several stormwater detention basins and swales in the center of the site, and non-native grasslands and forested areas along the edges of the site. The new buildings proposed by the project will be constructed of materials that are fire resistant, including metal and cinder block. Additionally, the project site's proximity to Highway 299 provides adequate access and response to the site in an emergency situation. As such, the project site does not exhibit topography, vegetation patterns, or other factors that would expose people or structures to a significant risk of wildland fires.

The Royal Gold facility has a variety of existing fire suppression infrastructure elements that were historically installed by others when the site was used for lumber milling activity and other industrial uses. The company has maintained and improved some of this infrastructure to meet the needs of its business and comply with current fire code requirements. Royal Gold has also installed several water storage tanks, which are available for fire suppression purposes. Through the Conditional Use Permit process, the BLFPD has conducted site visits and advised Royal Gold on the following: 1) fire suppression infrastructure in need of inspection and repair; and 2) the required design for the facility access roads to meet fire code requirements for emergency access. Royal Gold has contracted with Frontier Fire Protection to inspect the fire suppression infrastructure at the site and conduct the needed repairs. Royal Gold has also improved and maintained the facility access roads to comply with emergency access standards. Figure 22 – Fire Suppression and Access Map shows the existing fire suppression infrastructure at the site as well as the designated fire access roads.

As shown in Figure 3 – Assessor Parcel Numbers, the Royal Gold site is composed of sixteen separate parcels. These parcels are operated as one facility and the existing metal buildings from past industrial uses do not comply with some of the development standards in the U Zone or the Fire Safe Regulations. The newly constructed and proposed buildings would also be located in areas of the project site that do not meet the development standards in the U Zone or the Fire Safe Regulations. The exceptions being requested from the development standards are primarily for setbacks required from internal parcel property lines that exist within the facility boundary. In addition, there is limited vegetation within the facility boundary that would necessitate maintaining defensible space and the new buildings being proposed will be constructed of materials that are fire resistant, including metal and cinder block.

Therefore, the proposed project would not, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

c) *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?*
Less-than-significant Impact.

As discussed in the Setting, the project site is within a FHSZ that is classified as "moderate" and the forested hillsides surrounding the Mad River Valley are classified as a "high" FHSZ (CAL FIRE, 2021). The project site is located within the unincorporated community of Glendale and is currently served by existing water, wastewater, electrical, gas, and telecommunication facilities.

The project does not propose any additional access road or fuel breaks. As discussed in Section 2.3 – Project Description, installation of utility infrastructure (for example, electricity, water, etc.) is proposed to serve the new buildings at the site that were constructed

after the Conditional Use Permit approval in August 2016. Utility infrastructure is also proposed to be extended to proposed Buildings C, D, E, and F (Figure 6 – Site Plan).

Most of the proposed infrastructure improvements have minimal potential to increase the risk of wildfires due to the proposed locations away from surrounding vegetation and the lack of ignition sources and flammable materials. The proposed improvements that have the greatest potential to exacerbate fire risks includes the extension of electrical infrastructure. However, the extension of electric utility infrastructure to Buildings A-F will be installed underground and will occur within previously developed areas of the site. As such, these infrastructure improvements have a minimal potential to exacerbate fire risk.

The Royal Gold facility has a variety of existing fire suppression infrastructure elements that were historically installed by others when the site was used for lumber milling activity and other industrial uses. The company has maintained and improved some of this infrastructure to meet the needs of its business and comply with current fire code requirements. Royal Gold has also installed several water storage tanks, which are available for fire suppression purposes. Through the Conditional Use Permit process, the BLFPD has conducted site visits and advised Royal Gold on the following: 1) fire suppression infrastructure in need of inspection and repair; and 2) the required design for the facility access roads to meet fire code requirements for emergency access. Royal Gold has contracted with Frontier Fire Protection to inspect the fire suppression infrastructure at the site and conduct the needed repairs. Royal Gold has also improved and maintained the facility access roads to comply with emergency access standards. Figure 22 – Fire Suppression and Access Map shows the existing infrastructure at the site as well as the designated fire access roads. The proposed improvements to the fire suppression infrastructure at the site will minimize the potential for fire risk and improve the ability for BLFPD to extinguish any fires that occur at the site.

The infrastructure improvements proposed by the project would result in physical impacts to the project site, which have been previously analyzed under the appropriate resource sections of this document. The project has been designed and mitigated to reduce construction and operational impacts to less than significant. Mitigation was required for the proposed project as discussed in the following resource sections of this document:

- Aesthetics (Section 3.2.1)
- Air Quality (Section 3.2.3)
- Biological Resources (Section 3.2.4)
- Cultural Resources (Section 3.2.5)
- Energy (Section 3.2.6)
- Hazards and Hazardous Materials (Section 3.2.9)
- Hydrology and Water Quality (Section 3.2.10)
- Noise (Section 3.2.13)

No additional mitigation measures beyond those already identified would be required for the proposed project.

Therefore, the proposed project would not require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

d) *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?*
Less-than-significant Impact.

As discussed in the Setting, the project site is within a FHSZ that is classified as "moderate" and the forested hillsides surrounding the Mad River Valley are classified as a "high" FHSZ (CAL FIRE, 2021).

The Royal Gold facility is relatively flat and slopes generally to the south. Elevations at the project site range from approximately 90 feet above sea level in the south to approximately 125 feet in the north. According to the Humboldt County Web GIS system, most of the project site is mapped as having a stability rating of "Relatively Stable," with the exception of a small area in the northeastern corner of Assessor's Parcel Number (APN) 516-111-062, which is rated as "High Instability." Additionally, no historical landslides are mapped within or directly adjacent to the project site (Humboldt County, 2021a). According to FEMA Community Panel No. 06023C0694F, the project site is not within a special flood hazard area (FEMA, 2016). The FEMA map shows that the project site is located in an area of minimal flooding (no shading).

The project site has been used for industrial purposes since the 1950s and there have been no documented issues with slope stability (for example, landslides) or significant flooding. As discussed in Section 3.2.10 – Hydrology and Water Quality, the proposed project would not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite. Based on the location of the proposed project and compliance with existing laws and regulations, it is not expected that people or structures will be subject to significant risks due to runoff, post-fire instability, or drainage changes.

Therefore, the proposed project would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. Therefore, the proposed project would result in a less-than-significant impact on this category of environmental effect.

Mitigation Measures: No mitigation required.

Findings: The project would have a **Less-than-significant Impact** on Wildfire.

3.2.21 Mandatory Findings of Significance

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects).	☐	☒	☐	☐
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Environmental Setting:

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project also proposes several additional buildings, additional utility infrastructure, and other related improvements to accommodate the needs of the growing business. Daily operations will continue to primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see Figure 6 – Site Plan).

The project information provided for each of the topics above has been reviewed for all actions associated with the proposed project during both temporary construction and long-term operation. Based on the description of the proposed project and its location, the project would not result in any significant impacts with the incorporated project design elements, mitigation measures, as well as compliance with the standards and requirements of other regulating resource agencies. Based on the analysis undertaken as part of this Initial Study, the following findings can be made:

Analysis:

a) *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?*
Less-than-significant with Mitigation Incorporated.

All impacts to the environment, including impacts to habitat for fish and wildlife species, fish and wildlife populations, plant and animal communities, rare and endangered plants and animal species, and historical and prehistorical resources were evaluated as part of the analysis in this document. Where impacts were determined to be potentially significant, mitigation measures have been imposed to reduce those impacts to less-than-significant levels. In other instances, the project design and compliance with existing laws and regulations would reduce impacts of the projects to less-than-significant levels. Therefore, the proposed project as designed, mitigated, and in compliance with existing regulatory requirements, would not substantially degrade the quality of the environment and impacts would be less-than-significant with mitigation incorporated.

Mitigation Measures: All Mitigation Measures discussed is this document shall apply (see Section 3.2.22 – Discussion of Mitigation, Monitoring, and Reporting Program).

b) *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects).*
Less-than-significant with Mitigation Incorporated.

The proposed project seeks after-the-fact authorization for an existing potting soil and fertilizer manufacturing business (Royal Gold) that has been located at the project site since March 2009. The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. When Royal Gold moved to the site in 2009, it contained remnants of the former industrial uses including asphalt and concrete pavement, buildings, compacted gravel surfaces, constructed stormwater management features, fencing, and utility infrastructure. The majority of the improvements on the site in 2009 were in the southern portion of the site. The northern portion of the site contained compacted gravel surfaces and graded and compacted soils that were historically used for log storage (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo [Unknown Date]).

As discussed throughout this document, implementation of the proposed project has the potential to result in impacts to the environment that are individually limited, but are not cumulatively considerable, including impacts to aesthetics, air quality, biological resources, cultural resources, energy, hazards and hazardous materials, hydrology and water quality, and noise. In most instances where the project has the potential to result in individually limited significant impacts to the environment (including the resources listed above), mitigation measures have been imposed to reduce the potential effects to less-than-significant levels. In other instances, the project design and compliance with existing laws and regulations would reduce impacts of the project to less-than-significant levels.

Humboldt County has approved several permits for industrial uses and cannabis operations within the Mad River Valley. Due to the developed condition and history of uses at the project site, the proposed mitigation measures, and compliance with existing laws and regulations, the potential for the project to make a considerable contribution to potential cumulative impacts (for example, noise, fugitive dust, lighting, odors, etc.) from industrial

activities in the project area is limited. However, there is a potential for the project to contribute to cumulative water quality impacts in the Mad River watershed. These potential cumulative water quality impacts would not be cumulatively considerable due to compliance with existing regulatory requirements including, but not limited to, the State Water Resources Control Board (SWRCB) Industrial General Permit (IGP). Industrial operations in the project area, and elsewhere in the State, must comply with the requirements of the IGP. As discussed in Section 3.2.10 – Hydrology and Water Quality, the IGP requires industrial operators to prepare and implement Stormwater Pollution Prevention Plans and conduct sampling and monitoring to evaluate the effectiveness of best management practices and identify areas for continual stormwater quality improvement.

Therefore, the proposed project as designed, mitigated, and in compliance with existing regulatory requirements, would not have impacts that are individually limited, but cumulatively considerable. Therefore, impacts would be less-than-significant with mitigation incorporated.

Mitigation Measures: All Mitigation Measures discussed is this document shall apply (see Section 3.2.22 – Discussion of Mitigation, Monitoring, and Reporting Program).

c) *Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?*
Less-than-significant with Mitigation Incorporated.

The potential for the proposed project to result in environmental effects that could adversely affect human beings, either directly or indirectly, has been discussed throughout this document. In instances where the proposed project has the potential to result in direct or indirect adverse effects to human beings, including impacts to air quality, cultural resources, hazards and hazardous materials, and noise, mitigation measures have been applied to reduce the impact to below a level of significance. In other instances, the project design and compliance with existing laws and regulations would reduce impacts of the project to less-than-significant levels.

Therefore, the proposed project as designed, mitigated, and in compliance with existing regulatory requirements, would not have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly. Therefore, impacts would be less-than-significant with mitigation incorporated.

Mitigation Measures: Same as the following Mitigation Measures related to construction and operation of the proposed project:

AQ-1. **Facility Dust Mitigation and Housekeeping Plan** (see Section 3.2.3 – Air Quality)

AQ-2. **Odor Impact Minimization Plan** (see Section 3.2.3 – Air Quality)

CR-2. **Human Remains** (see Section 3.2.5 – Cultural Resources)

HHM-1. **Soil and Groundwater Management Plan** (see Section 3.2.9 – Hazards and Hazardous Materials)

NO-1. **Construction Noise Limitations** (see Section 3.2.13 – Noise)

NO-2. **Operational-Related Noise Control Measures** (see Section 3.2.13 – Noise)

Findings: The proposed project as designed, mitigated, and in compliance with existing regulatory requirements, would have a **Less-than-significant Impact with Mitigation Incorporated** related to the mandatory findings of significance.

3.2.22 Discussion of Mitigation Measures, Monitoring, and Reporting Program

Mitigation Measures, Monitoring, and Reporting Program (MMRP)

All of the following mitigation measures are required to mitigate impacts from the Royal Gold Soil Operation.

AE-1. International Dark-Sky Association Compliance: All new outdoor lighting fixtures shall comply with the International Dark-Sky Association's (IDA) requirements for reducing waste of ambient light (such as, shall be "dark sky compliant"). This includes, but is not limited to, requirements for acceptable fixture types, shielding, and maximum color temperature. The IDA recommendations can be found on their website at the following address: https://www.darksky.org/our-work/lighting/lighting-for-citizens/lighting-basics/. To ensure compliance with the IDA recommendations, the applicant shall submit a Lighting Plan to the Humboldt County Planning and Building Department for review and approval as part of the building permit application process.

Monitoring and Reporting Requirements for Mitigation Measure AE-1

Timing for Implementation/Compliance	Prior to issuance of building permit(s) by Humboldt County and ongoing during project operation.
Person/Agency Responsible for Monitoring	Applicant and Humboldt County Planning & Building Department (HCP&BD).
Monitoring Frequency	Prior to issuance of building permit(s) by Humboldt County and ongoing during project operation.
Evidence of Compliance	The County shall condition the project to require a Lighting Plan to be submitted for review and approval as part of the building permit application process. Issuance of the building permit(s) and the final inspection shall be evidence of compliance with this mitigation measure.

AQ-1. Facility Dust Mitigation and Housekeeping Plan: As detailed in the Facility Dust Mitigation and Housekeeping Plan for NCUAQMD Permit to Operate (FID #472-12), Royal Gold will implement the following measures to minimize nuisance dust generation:

1. Track-out onto the paved public road

The following measures to minimize dust generation from track-out onto Glendale Drive shall be adhered to including:

a) Any visible track-out onto Glendale Drive shall be removed as needed using one of several street sweepers. A log of all street sweeper activity will be kept onsite.

b) To minimize dust and/or track-out of materials, the entrances/exits for the facility are paved from their intersections with Glendale Drive to the following distances into the site:

- The main entrance/exit at the site on APN 516-101-008 has pavement extending approximately 300 feet from the intersection with Glendale Drive.
- The exit from the site on APN 516-101-079 has pavement extending approximately 80 feet from the intersection with Glendale Drive.
- The exit at the site on APN 516-111-062 has pavement extending approximately 70 feet from the intersection with Glendale Drive.

2. Active Storage Piles

a) Active material stockpiles are kept tarped except during the addition and removal of material to minimize dust generation whenever feasible.

b) Active material stockpiles for the bagging lines are kept in concrete bins, under the cover of the pole-shed buildings or be tarped daily.

3. Exposed Areas and Inactive Stockpiles

The following measures to minimize dust generation from exposed areas, inactive stockpiles, or soil materials shall be adhered to including:

a) Periodic watering of the access roads and work areas during activity at the site shall occur to reduce fugitive dust emissions. During project operations, two water trucks are used for watering the access roads and work areas as needed. Manual hose watering of work areas also occurs as needed during times of peak activity.

b) Inactive material stockpiles shall be adequately wetted, covered with tarps, and/or placed under covered structures to minimize dust generation.

c) When wind speeds exceed 15 m.p.h. and result in dust emissions crossing the property line, activities shall be suspended until the area is adequately wetted.

d) Wood particles or other similar materials deposited on the roof of any buildings, on the ground, or elsewhere shall be removed or controlled as soon as practicable. A street sweeper is used to increase the efficiency of collecting the material.

e) Daily logs will be kept onsite documenting all dust mitigation activities including the application of water and sweeping of fugitive soil material.

f) Metal walls have been installed on the southern and eastern sides of the compost storage building on APNs 516-101-060 and 516-111-063 to limit wind exposure and minimize dust generation.

g) No stockpiles will be stored in the southeast portion of the facility, as delineated on the Facility Site Plan, to minimize dust from escaping offsite to the south and east.

4. Traffic on Onsite Unpaved Roads, Parking Lots, and Staging Areas

The following measures to minimize dust generation from traffic on onsite unpaved roads, parking lots, and staging areas shall be adhered to including:

a) Equipment and vehicles/trucks on site shall be required to maintain a maximum 10 m.p.h. speed limit. Speed limits are posted onsite in several locations.

b) Equipment and vehicle/truck traffic on site shall be restricted to roads, parking lots, and staging areas that are either:

- Adequately wetted (such as sufficiently mixed or penetrated with liquid to prevent the release of particulates);
- Maintained with a minimum 3" gravel coating of less than 5% silt content and 0.10% NOA content;
- Coated with a chemical dust suppressant such as lignin or magnesium chloride; or
- Paved.

5. Earth Moving Activities

The project does not typically involve earth moving activities including quarrying, excavation, or grading. When grading or excavation is proposed for the installation of storage buildings, utilities, stormwater improvements and maintenance, access road maintenance, landscaping, etc., the following measures shall be adhered to including:

a) Pre-wetting the ground to the depth of anticipated cuts during dry months.

b) Application of water prior to any land clearing.

c) Suspending grading operations during dry months when wind speeds are high enough to result in dust emissions crossing the property line.

d) All dust mitigation activities including the application of water and the suspension of grading activities will be documented and records will be kept onsite.

6. Offsite Transport

The offsite transport of packaged and palletized soil material generates minimal dust. During the offsite transport of bulk soil material using open bodied trucks the following measures shall be adhered to including:

a) Loads shall maintain adequate moisture content before and during loading.

b) Loads shall be covered with tarps.

7. Material Handling/Processing

Processing equipment used at the Royal Gold facility includes a horizontal grinder, screener, bale buster, and soil mixing/bagging lines. To minimize dust generation during processing activities, the following measures are adhered to including:

<u>Grinder</u> (CMI Biogrind 175)

a) The grinder is operated under covered buildings to limit wind exposure.

b) All materials processed with the grinder are adequately wetted prior to processing.

c) The grinder is equipped with water spray bars.

d) To minimize dust from escaping from the grinder area, geotextile nylon screens are hung from the structures where grinding occurs.

Screener (Terex Phoenix 2100)

a) The trommel screener will be located a minimum of 300 feet from the nearest residential property line to minimize dust from escaping offsite.

b) A fabricated shroud has been placed on the end of the screener to direct dust and materials downward.

c) The belt on the screener has been lowered so materials do not fall as far before reaching the finished stockpile.

Bale Buster (Kase Gobbler Model #3561)

a) The bale buster is operated in a covered, enclosed building on APNs 516-111-062 and -063 (see Facility Site Plan).

Soil Mixing/Bagging Lines (Bouldin & Lawson mixing lines, Bouldin & Lawson and Premier Bagging Lines)

a) The soil mixing/bagging lines are located in covered buildings to limit wind exposure and minimize dust generation.

b) The soil mixing/bagging lines are equipped with water spray bars.

c) Amendment hoppers are located in enclosed "dust huts" with air filters to reduce fugitive dust.

Monitoring and Reporting Requirements for Mitigation Measure AQ-1

Timing for Implementation/Compliance	Ongoing compliance during project operation with annual review by the North Coast Unified Air Quality Management District (NCUAQMD).
Person/Agency Responsible for Monitoring	Applicant and NCUAQMD Air Pollution Control Officer.
Monitoring Frequency	Ongoing by applicant during project operation and annually by NCUAQMD as part of the annual compliance inspection and renewal of the Permit to Operate.
Evidence of Compliance	Annual renewal of the Permit to Operate by the NCUAQMD and lack of unresolved complaints as documented by the NCUAQMD.

AQ-2. Odor Impact Minimization Plan: To minimize potential impacts from odors generated by the handling of commercially-produced compost and softwood sawdust, Royal Gold will implement the Odor Impact Minimization Plan required by the Humboldt County

Division of Environmental Health as part of the Environmental Agency Notification for green material composting operations.

Monitoring and Reporting Requirements for Mitigation Measure AQ-2

Timing for Implementation/Compliance	Ongoing compliance during project operation.
Person/Agency Responsible for Monitoring	Applicant and the Humboldt County Division of Environmental Health (HCDEH).
Monitoring Frequency	Ongoing by applicant during project operation to determine if there is potential for impacts to surrounding odor receptors.
Evidence of Compliance	Lack of unresolved complaints as documented by the HCDEH.

BR-1. Wetland Mitigation: To mitigate for existing and proposed impacts to approximately 1.57 acres of wetland area at the project site, Royal Gold shall implement the Wetland Mitigation and Monitoring Plan Addendum 1 (see Appendix 5.7; SHN, 2020). Wetland creation shall be documented within an "As Constructed" report recording grading depths, vegetation planted (number and species), and hydrology observed following the first soaking rains. Permanent monitoring plots representative of conditions (along transects capturing the differing elevations and wetland types being developed) will be established as part of this effort with permanent markers and GPS data to ensure the plot locations are found in subsequent monitoring years. Plots must be of a number and orientation so as capture all wetland design conditions present throughout the wetland mitigation area and should be a statistically significant representative of the mitigation area. This will be used as the post-construction baseline from which to gauge the trajectory of wetland habitat development. Wetland creation success criteria and monitoring requirements shall include the following:

- Successful wetland mitigation shall be defined as the creation of three-parameter wetlands throughout the wetland mitigation area after a period of five years. Wetland mitigation should result in a mosaic of seasonally and permanently saturated wetland types similar to the hydrology observed within the impacted wetlands as described in the WMMP.
- All wetland monitoring shall be conducted during the rainy season after a minimum of ten inches have accumulated locally. Wetland monitoring shall be conducted concurrently with and in addition to the vegetation monitoring described in the WMMP.
- Wetland vegetation and hydrology shall be assessed in year three. Both hydrophytic vegetation dominance and wetland hydrology indicators shall be recorded from each of the permanent plots established in the "As Constructed" report. Conditions shall be recorded on ACOE Wetland Determination Data Forms and will use the same metrics to determine vegetation dominance and wetland hydrology indicators.

All permanent plots will be investigated for all three wetland parameters in year five to determine the success of the wetland mitigation effort. This will include wetland test pits, which will be investigated using the ACOE wetland delineation methods.

Monitoring and Reporting Requirements for Mitigation Measure BR-1

Timing for Implementation/Compliance	After issuance of the Conditional Use Permit and other federal/state agency permits.
Person/Agency Responsible for Monitoring	Applicant, U.S. Army Corps of Engineers (USACE), North Coast Regional Water Quality Control Board (North Coast RWQCB), California Department of Fish and Wildlife (CDFW), and Humboldt County Planning & Building Department (HCP&BD).
Monitoring Frequency	In years 1, 3, and 5 after construction of the wetland mitigation area.
Evidence of Compliance	Successful creation of three-parameter wetlands after the 5-year monitoring period as measured through quantitative and qualitative analysis and measurements submitted for review and approval by all permitting agencies with jurisdiction.

BR-2. Habitat Enhancements for Encroachment into Streamside Management Areas (SMAs): To mitigate for existing and proposed encroachments into the SMAs at the project site, the following habitat enhancements shall be implemented. The location of the proposed habitat enhancements is shown in Figure 16 – Mitigation Measures Proposed for SMA Encroachments.

- Wetland Enhancement Area 1: This habitat enhancement involves enhancement of approximately 19,166 sf of lesser-functioning wetlands on the edge of the wetland complex in the northwest portion of the site (see Figure 16 – Mitigation Measures Proposed for SMA Encroachments). The enhancement activities include the removal of non-native botanical species and planting of freshwater emergent wetland plants including Pacific willow (*Salix lasiandra* var. *lasiandra)*, arroyo willow (*Salix lasiolepis)*, Douglas spirea (*Spirea douglasii*), salmonberry (*Rubus spectabilis*), common rush (*Juncus effusus* ssp. *Pacificus)*, spreading rush (*Juncus patens*), panicled bulrush (*Scirpus microcarpus*), tall flatsedge (*Cyperus eragrostis*), slough sedge (*Carex obnupta*), brownhead rush (*Juncus phaeocephalus*), and arctic sweet colt's foot (*Petasites frigidus)*. The planting recommendations for this area are included in the Wetland Mitigation and Monitoring Plan (SHN, 2019b), which is attached to the Wetland Mitigation and Monitoring Plan Addendum 1 (see Appendix 5.7; SHN, 2020).

- Wetland Enhancement Area 2: This habitat enhancement involves enhancement of approximately 6,568 sf of lesser-functioning wetlands on the eastern boundary of the site (see Figure 16 – Mitigation Measures Proposed for SMA Encroachments). This includes a portion of the wetland area that would be remaining after the improvements are completed for full buildout of the Royal Gold facility. The enhancement activities include the removal of non-native plant species and planting of similar freshwater emergent wetland plants to what is proposed for Wetland Enhancement Area 1. The planting recommendations in the Wetland Mitigation and Monitoring Plan (SHN, 2019b) would also be applied to Wetland Enhancement Area 2 (see Appendix 5.7; SHN, 2020).

- Riparian Enhancement Area 1: This habitat enhancement would involve enhancement of a 12,854 sf portion of the riparian corridor in the northwestern portion of the site (see Figure 16 – Mitigation Measures Proposed for SMA Encroachments) that has been impacted by adjacent residents to the west of the Royal Gold facility. The impacts that have occurred to this area of the site have included dumping of trash, abandonment of vehicles, spilling of oils and fuels, erosion and sedimentation, and the construction of unpermitted stream crossings, culverts, and berms/impoundments. The enhancement activities would include the removal of trash and sources of contamination in and around the stream channel, stabilization of stream channel erosion, the removal of unpermitted stream crossings, culverts, and berms/impoundments, removal of invasive plant species, and the planting of native plant species. Native plant species that would be planted in this area include those found within the lesser disturbed portions of the stream such as slough sedge (*Carex obnupta)*, common rush (*Juncus effusus ssp. Pacificus*), water parsley (*Oenanthe sarmentosa*), and skunk cabbage (*Lysichiton americanus*).

- Invasive Species Removal Area 1: This habitat enhancement includes the removal and continued management of invasive plant species in an approximately 14,444 sf area in the northeastern corner of the site. The plant species to be targeted for removal include scotch broom (*Cytisus scoparius*) and pampas grass (*Cortaderia jubata*). This enhancement activity will minimize the potential for the spread of this invasive plant species at the project site and on adjacent properties to the north and east.

- Invasive Species Removal Area 2: This habitat enhancement includes the removal and continued management of invasive plant species in an approximately 36,332 sf area in and around the central stormwater detention basins at the site. The plant species to be targeted for removal include scotch broom (*Cytisus scoparius*) and pampas grass (*Cortaderia jubata*). This enhancement activity will minimize the potential for the spread of this invasive plant species at the project site, at downstream locations, and offsite.

- Security Fencing: Similar to the concept behind the use of livestock exclusionary fencing to protect riparian and wetland areas, security fencing shall be constructed along the western boundary of the site to prevent continued trespassing by adjacent residents and further degradation of the riparian corridor and wetlands in the northwest portion of the site. The alignment of the proposed fencing is shown in Figure 16 – Mitigation Measures Proposed for SMA Encroachments. The security fencing will increase the likelihood of success for the enhancement activities proposed for Riparian Enhancement Area 1.

After completion of the proposed habitat enhancements, an "As Planted Report" will be prepared to document the removal of invasive species and/or the planting of native species. The Report will identify the location and type of invasive species removed from the lesser-functioning habitat areas at the site that are identified above and shown on Figure 16 – Mitigation Measures Proposed for SMA Encroachments. The Report will also identify the native species planted, planting locations, and number of individuals planted. The "As Planted Report" will document the baseline conditions and criteria for assessing percent survival of native plantings and the success of invasive species removal. Local reference sites for invasive species removal success criteria will be identified in the Report, which will include undisturbed wetland, riparian, and

upland habitat areas (as applicable to the type of habitat enhancement proposed). The "As Planted Report" will be submitted for review and approval by all permitting agencies with jurisdiction.

To determine the success of the proposed habitat enhancements, both quantitative and qualitative sampling will be performed by a qualified professional. With the exception of the proposed security fencing, monitoring will occur in years 1, 3, and 5 after completion of the proposed habitat enhancements. The monitoring activity will be documented in monitoring reports that will be submitted for review and approval by all permitting agencies with jurisdiction. Any mortality of native plantings within the initial 3 years of the monitoring period will be replanted to achieve an 85 percent survival success rate by the end of the monitoring period. If the invasive species removal success criteria are not being met by year 3 of the monitoring period, additional invasive plant removal activities will be conducted to achieve conditions substantially similar to the local reference sites by the end of the monitoring period. Any replanting of native species or additional invasive species removal required to achieve the success criteria will be documented in the monitoring reports.

Monitoring and Reporting Requirements for Mitigation Measure BR-2

Timing for Implementation/Compliance	After construction of the proposed improvements at the Royal Gold facility.
Person/Agency Responsible for Monitoring	Applicant, U.S. Army Corps of Engineers (USACE), North Coast Regional Water Quality Control Board (North Coast RWQCB), California Department of Fish and Wildlife (CDFW), and Humboldt County Planning & Building Department (HCP&BD).
Monitoring Frequency	In years 1, 3, and 5 after completion of the proposed habitat enhancements.
Evidence of Compliance	Successful completion of habitat enhancements after the 5-year monitoring period as measured through quantitative and qualitative sampling submitted for review and approval by all permitting agencies with jurisdiction.

BR-3. <u>Seasonal Restrictions on Maintenance of Stormwater Detention Basins</u>:
Maintenance activities including dredging and aquatic plant removal shall occur outside the breeding and development season for special-status amphibians such as the northern red-legged frog. Maintenance activities shall occur between June 1 and October 15. If dewatering is required as part of maintenance activities, pump intakes shall be covered with 0.125-inch mesh to prevent entrainment of amphibians. If stormwater detention basin maintenance occurs between June 1 and August 31, nesting bird surveys should be conducted prior to maintenance activities according to the methods outlined in Mitigation Measure BR-6 – Nesting Bird Surveys.

Monitoring and Reporting Requirements for Mitigation Measure BR-3

Timing for Implementation/Compliance	As required annually between June 1 and October 15.

Person/Agency Responsible for Monitoring	Applicant, California Department of Fish and Wildlife, and Humboldt County Planning & Building Department.
Monitoring Frequency	As required annually between June 1 and October 15.
Evidence of Compliance	Documentation of maintenance activities by Applicant and any required biological surveys.

BR-4. Special-status Amphibian Surveys: If construction or routine maintenance activities that involve grading or other ground disturbance begin during the breeding season (generally October 16 to May 31), a qualified biologist shall conduct diurnal Visual Encounter Surveys (VES) for special-status amphibian species within and immediately adjacent to the project area(s) no more than three days prior to activities. If egg masses or tadpoles are located during the survey, one of the following protective measures shall be implemented:

- Do not commence construction or routine maintenance activities that involve grading or other ground disturbance until after May 31; or
- Monitoring shall be done by a qualified biologist every seven days until amphibians have metamorphosed to subadults (or experience natural mortality); or
- Non-listed* special-status aquatic species (egg masses or larval-stage) shall be relocated outside the area of impact to an appropriate location, in consultation with CDFW, by a qualified biologist prior to construction activities. (*Threatened, Endangered, or Candidate species cannot be relocated without an Incidental Take Permit from CDFW).

Monitoring and Reporting Requirements for Mitigation Measure BR-4

Timing for Implementation/Compliance	As required annually between October 16 and May 31.
Person/Agency Responsible for Monitoring	Applicant, California Department of Fish and Wildlife (CDFW), and Humboldt County Planning & Building Department.
Monitoring Frequency	As required annually for any construction or routine maintenance activities occurring between October 16 and May 31.
Evidence of Compliance	Documentation of maintenance activities by Applicant and any required biological surveys or protective measures implemented in consultation with CDFW.

BR-5. Annual Detention Basin Maintenance Protocol: The following stormwater detention basin maintenance shall be implemented annually during the specified seasonal window (June 1 to October 15) for all existing and proposed stormwater detention basins:

1. Beginning after June 1 (to ensure that there are no significant impacts to amphibian species), all stormwater detention basins on the facility shall be drained if water is still present. During draining, pump intakes shall be covered with 0.125-inch mesh to prevent entrainment of amphibians.

2. If special-status aquatic animals are encountered during detention basin maintenance (for example, Northern red-legged frog), non-listed* special-status aquatic animal species shall be relocated by a qualified biologist outside the area of impact to an appropriate location, in consultation with CDFW. (*Threatened, Endangered, or Candidate species cannot be relocated without an Incidental Take Permit from CDFW, although no listed species are expected to be encountered in the stormwater basins).
3. Once the detention basins have dried up, they shall be inspected for sediment accumulation.
4. If sediment requires removal, that shall be completed prior to October 1st.
5. Vegetation shall be thinned at the time of sediment removal depending on the species. The focus shall be on removing fast growing floating aquatic plants and other fleshy wetland plants.

Monitoring and Reporting Requirements for Mitigation Measure BR-5

Timing for Implementation/Compliance	As required annually between June 1 and October 15.
Person/Agency Responsible for Monitoring	Applicant, California Department of Fish and Wildlife (CDFW), and Humboldt County Planning & Building Department.
Monitoring Frequency	As required annually for any maintenance activities occurring between June 1 and October 15.
Evidence of Compliance	Documentation of maintenance activities by Applicant and any required biological surveys or protective measures implemented in consultation with CDFW.

BR-6. Nesting Bird Surveys: If construction activities begin during the bird nesting season (generally March 15 to August 31), a qualified biologist shall conduct nest surveys no more than seven days prior to activities, within the construction limits and within 100 feet (200 feet for raptors) of the construction limits. If an active nest is located during the survey, the following protective measures shall be implemented:

- A no-disturbance buffer shall be established around the nest by the qualified biologist, in consultation with CDFW and USFWS.
- Protective buffers (no-disturbance area around the nest) shall be established at a distance determined by the biologist based on the nesting species, its sensitivity to disturbance, and type of and duration of disturbance expected. Protective buffers shall remain in place until the young have fledged.
- Construction activities outside buffers may proceed while active nests are being monitored, at the discretion of the qualified biologist. If active nests are found to be at risk due to construction activities, construction activities shall be delayed until the qualified biologist determines that the young have fledged.

Monitoring and Reporting Requirements for Mitigation Measure BR-6

Timing for Implementation/Compliance	As required annually between March 15 and August 31.
Person/Agency Responsible for Monitoring	Applicant, California Department of Fish and Wildlife (CDFW), U.S. Fish and Wildlife Service (USFWS), and Humboldt County Planning & Building Department.
Monitoring Frequency	As required annually for any construction activities occurring between March 15 and August 31.
Evidence of Compliance	Documentation of construction activities by Applicant and any required biological surveys or protective measures implemented in consultation with CDFW and USFWS.

BR-7. Wildlife Movement: To allow for the continued movement of wildlife through the established wildlife corridors at the project site, without entrapment or entanglement, the following fencing design recommendations shall be followed:

- If fencing is installed along the northern or eastern property boundaries of the project site, it shall be a smooth wire or rail no more than 40" high and the lowest rail/wire 18" above the ground. If using a wire fence, the top two wires shall be at least 12" apart (Paige, 2008).
- It is recommended that the 6-foot-tall security fencing proposed along the western property boundary of the Royal Gold facility be designed without barbwire or razor wire. However, if it is determined that barbwire or razor wire are essential to preventing trespassing at the facility, the fencing shall be designed according to the following specifications (see Figure 20 – Proposed Security Fencing Design):
    - From the ground to 48 inches (0 to 4 feet), install chain link fence with 6-foot tall poles.
    - From 48 to 60 inches (4 to 5 feet), install flat wrap razor wire affixed to the chain-link fence and the 6-foot-tall poles, and attach flagging or reflective material to the flat wrap razor wire (see photo) throughout the length of the fence.

- From 60 to 72 inches (5 to 6 feet), install two lines of smooth wire (12 inches apart) pulled taught and affixed to the 6-foot-tall poles.

Photo example of flat wrap razor wire

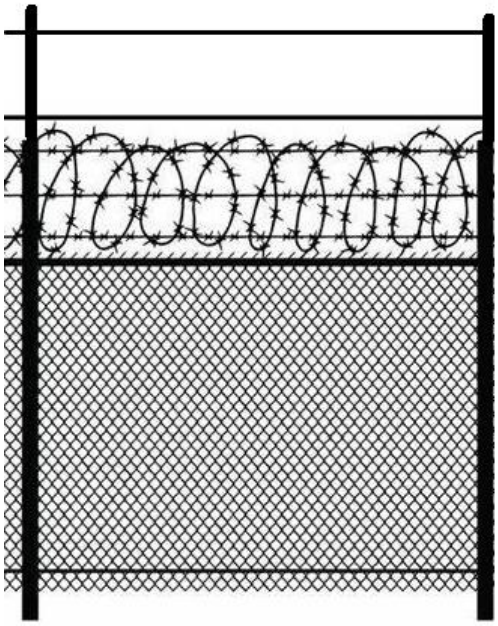


Figure 20: Proposed Security Fencing Design

Monitoring and Reporting Requirements for Mitigation Measure BR-7

Timing for Implementation/Compliance	Prior to fencing installation and after fencing construction.
Person/Agency Responsible for Monitoring	Applicant, California Department of Fish and Wildlife (CDFW), and Humboldt County Planning & Building Department (HCP&BD).
Monitoring Frequency	Prior to fencing installation and after fencing construction.
Evidence of Compliance	Review and approval of the fencing design prior to installation and review of installed fencing after construction by the CDFW and HCP&BD.

CR-1. <u>Inadvertent Discovery</u>: If cultural resources are encountered during construction activities, all onsite work shall cease in the immediate area and within a 50-foot buffer of the discovery location. A qualified archaeologist will be retained to evaluate and assess the significance of the discovery, and develop and implement an avoidance or mitigation plan, as appropriate. For discoveries known or likely to be associated with Native American heritage (prehistoric sites and select historic period sites), the Tribal Historic Preservation Officers

(THPO) for the Blue Lake Rancheria, Wiyot Tribe and the Bear River Band of the Rohnerville Rancheria should be contacted immediately to evaluate the discovery and, in consultation with the project proponent, the County, and consulting archaeologist, develop a treatment plan in any instance where significant impacts cannot be avoided. Prehistoric materials which could be encountered include obsidian and chert debitage or formal tools, grinding implements, (for example, pestles, handstones, bowl mortars, slabs), locally darkened midden, deposits of shell, faunal remains, and human burials. Historic archaeological discoveries may include nineteenth century building foundations, structural remains, or concentrations of artifacts made of glass, ceramics, metal or other materials found in buried pits, wells or privies.

Monitoring and Reporting Requirements for Mitigation Measure CR-1

Timing for Implementation/Compliance	Throughout project construction.
Person/Agency Responsible for Monitoring	Applicant, contractors, Wiyot Tribe, Blue Lake Rancheria, Bear River Band of Rohnerville Rancheria, and Humboldt County Planning & Building Department.
Monitoring Frequency	Throughout project construction.
Evidence of Compliance	Documentation of any cultural resources encountered and implementation of protective measures in consultation with the THPOs for the Wiyot Tribe, Blue Lake Rancheria, and Bear River Band of Rohnerville Rancheria.

CR-2. Human Remains: If previously unidentified evidence of human burial or human remains are discovered during project construction, work will stop at the discovery location, within 20 meters (66 feet), and any nearby area reasonably suspected to overlie human remains (Public Resources Code, Section 7050.5), the Humboldt County Coroner must be informed and consulted, per State law. If the coroner determines the remains to be Native American, he or she shall contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descendent. The most likely descendent will be given an opportunity to make recommendations for means of treatment of the human remains and any associated grave goods. when the commission is unable to identify a descendant or the descendants identified fail to make a recommendation, or the landowner or his or her authorized representative rejects the recommendation of the descendants and the mediation provided for in subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance. Work in the area shall not continue until the human remains are dealt with according to the recommendations of the County Coroner, Native American Heritage Commission and/or the most likely descendent have been implemented.

Monitoring and Reporting Requirements for Mitigation Measure CR-2

Timing for Implementation/Compliance	Throughout project construction.

Person/Agency Responsible for Monitoring	Applicant, contractors, County Coroner, and Native American Heritage Commission (as required).
Monitoring Frequency	Throughout project construction.
Evidence of Compliance	Documentation of any human remains encountered and reporting to the County Coroner and/or NAHC.

EN-1. <u>RCEA Repower+ Program</u>: To minimize potential impacts from operational energy use, Royal Gold shall maintain its participation in the Redwood Coast Energy Authority (RCEA) Repower+ program, or secure power through any similar entity offering electricity generated from 100 percent renewable energy sources. Royal Gold's participation in this program shall occur until such time as RCEA is able to provide 100 percent renewable energy to all of its customers. To ensure compliance with this mitigation measure, the Humboldt County Planning & Building Department reserves the right to request that the applicant supply copies of their electric utility billing records upon request.

Monitoring and Reporting Requirements for Mitigation Measure EN-1

Timing for Implementation/Compliance	Throughout project operation.
Person/Agency Responsible for Monitoring	Applicant and Humboldt County Planning & Building Department (HCP&BD).
Monitoring Frequency	Throughout project construction.
Evidence of Compliance	Submittal of electric utility bill to HCP&BD for review and approval.

HHM-1. <u>Soil and Groundwater Management Plan</u>: Due to potential remaining contamination on the project site from past lumber mill uses, the applicant shall implement the Soil and Groundwater Management Plan (SGMP) for all future ground disturbing activities (see Appendix 5.8; SHN, 2021d). The SGMP addresses recommendations for characterization of soil and groundwater impacted by potential site contaminants (PSCs) prior to proposed construction activities for worker safety, potential onsite reuse or offsite disposal, and management of excavated material at the property. The SGMP provides recommended guidance to protect site construction workers, the public, and the environment from PSCs in soil and/or groundwater encountered during site activities. The SGMP includes recommended actions to address handling, onsite reuse, and offsite disposal of contaminated soil and/or groundwater, if necessary. The objective of the SGMP is to ensure that no significant impacts occur to nearby sensitive receptors, aquatic species, and water resources. The SGMP will be provided to and used by Royal Gold staff, and training will be provided regarding adherence to its recommendations. The SGMP shall also be provided to contractors prior to conducting work at the site involving ground disturbance.

Monitoring and Reporting Requirements for Mitigation Measure HHM-1

Timing for Implementation/Compliance	During ground-disturbing activities at the project site.

Person/Agency Responsible for Monitoring	Applicant, contractors, Department of Toxic Substances Control (DTSC), and Humboldt County Planning & Building Department (HCP&BD).
Monitoring Frequency	During ground-disturbing activities at the project site.
Evidence of Compliance	Documentation of ground-disturbing activities and any required soil and groundwater sampling results submitted to the DTSC and HCP&BD.

NO-1. Construction Noise Limitations. The following measure will be implemented during construction activities to reduce noise levels:

- Construction activities shall be restricted to the hours between 8:00 a.m. and 5:00 p.m. Monday through Friday, and between the hours of 9:00 a.m. and 5:00 p.m. on Saturdays and Sundays.
- Construction activity will not occur on holidays.

Monitoring and Reporting Requirements for Mitigation Measure NO-1

Timing for Implementation/Compliance	Throughout project construction.
Person/Agency Responsible for Monitoring	Applicant, contractors, and Humboldt County Planning & Building Department (HCP&BD).
Monitoring Frequency	Throughout project construction.
Evidence of Compliance	Lack of unresolved complaints as documented by the HCP&BD.

NO-2. Operation-Related Noise Control Measures. The following measure regarding the project's operation-related noise shall be implemented within one-year of the effective date of the Conditional Use Permit to reduce the sound levels of the horizontal grinder on APN 516-101-079 to below the County's noise standard for residential uses. Mitigation options include the following:

- Relocate the horizontal grinder in the pole-shed building on APN 516-101-079 to Building A in the central portion of the site;
- Relocate the grinding activity to the central portion of the site adjacent to Building A and replace the horizontal grinder with equipment that produces lower sound levels (coir buster); and/or
- Install sound attenuation improvements (for example, walls or sound curtains) that have a minimum sound transmission class (STC) rating of 20 along the open sides of the pole-shed building on APN 516-101-079.

Royal Gold shall implement one or more of these options as required to achieve compliance with the County's 60 dBA CNEL/Ldn noise standard. To verify the effectiveness of the implemented mitigation option(s), Royal Gold shall hire an acoustical expert to conduct a Noise Study. If the implemented mitigation is determined to be ineffective in reducing the sound levels to below the County's 60 dBA CNEL/Ldn noise standard, additional mitigation and noise measurements shall

be required until the standard is achieved. All documentation related to Royal Gold's compliance with the County noise standards (for example, Noise Study Report, sound measurement logs, etc.) shall be submitted to the Humboldt County Planning and Building Department (HCP&BD) for review and approval.

Monitoring and Reporting Requirements for Mitigation Measure NO-2

Timing for Implementation/Compliance	Within one-year of the effective date of the Conditional Use Permit (CUP) and ongoing during project operation (as required).
Person/Agency Responsible for Monitoring	Applicant, contractors, and Humboldt County Planning & Building Department (HCP&BD).
Monitoring Frequency	Within one-year of the effective date of the Conditional Use Permit (CUP) and ongoing during project operation (as required).
Evidence of Compliance	Review and approval of the Noise Study report by the HCP&BD and lack of unresolved complaints as documented by the HCP&BD.

4. References

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5. Appendices

5.1 Plan of Operations

5.2 Facility Housekeeping and Dust Mitigation Plan

5.3 CalEEMod Emissions Modeling

5.4 Odor Impact Minimization Plan

5.5 Updated Biological Report

5.6 Wetland and Other Waters Delineation Report - Final

5.7 Wetland Mitigation and Monitoring Plan Addendum 1

5.8 Soil and Groundwater Management Plan

5.9 Stormwater Pollution Prevention Plan

Plan of Operations 5.1

Royal Gold

PLAN OF OPERATIONS

Humboldt County, California

Conditional Use Permit (CUP-13-021) for a Soil Manufacturing Operation

REVISED May 2022

Applicant: Royal Gold, LLC
600 F Street, Suite #3, Box #603,
Arcata, California 95521
(707) 822-4653, FAX (707) 825-8832

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I. GENERAL INFORMATION

1. Project Activity Summary

Royal Gold, LLC (Royal Gold) is a premium potting soil and fertilizer manufacturing business located at 1689 Glendale Drive in the unincorporated community of Glendale in Humboldt County (see Figure 1 – Project Location and Figure 2 – Project Area). Royal Gold is proud to be the first coco pith-based soil company in the United States. Coco pith is used as the base ingredient for many of the company's soil products, which is a sustainable by-product of the coconut industry. Royal Gold products are primarily made from waste products/by-products including, but not limited to coco pith, sawdust, compost, and fish bone meal. In addition to premium potting soils, Royal Gold also produces an organic fertilizer. Daily operations primarily involve the blending and mixing of potting soils, raw material processing, and shipping and receiving activities (see additional discussion in Chapter II – Plan of Operations).

Royal Gold has been operating since 2005 and in its current location since March 2009. Royal Gold applied for an after-the-fact Conditional Use Permit in 2013 (CUP-13-021) and received approval from the Humboldt County Planning Commission in August 2016. Humboldt Baykeeper, a local non-profit organization, appealed the Commission's approval. Sometime later, Humboldt Baykeeper sued Royal Gold in federal court under the Clean Water Act. Royal Gold and Baykeeper settled the lawsuit in 2017. Royal Gold has worked to address the concerns raised in the planning process and implement the settlement agreement. As Royal Gold's business has grown, it has expanded its operations while complying with additional regulatory requirements. This revised Plan of Operations is submitted as an update on the expanded operations and improvements at the project site, and to identify proposed additional improvements.

2. Applicant/Property Owner Information

a. Applicant/Lessee/Operator

Royal Gold, LLC, Chad Waters, 600 F Street, Suite #3, Box #603, Arcata, CA 95521, (707) 822-4653, FAX (707) 825-8832

b. Property Owner(s)

The project is proposed to occur on sixteen separate parcels owned by two individuals, two companies, and one railroad authority. Two parcels, APNs (APN) 516-101-079 and -083 (total 4.06 acres) are owned by Gary & Virginia Island. Ten parcels, APNs 516-101-008, -017, -040, -041, -063, -064, -068, -081, -084, and 516-111-062 (total 39.21 acres) are owned by RGolden Holdings LLC. Two parcels, APNs 516-101-060 and 516-111-063 (1.59 acres) are owned by Blue Lake Forest Products, Inc. Two parcels, APNs 516-101-005 and 516-111-003 (total 1.12 acres) are owned by North Coast Railroad Authority (see Figure 3 – APNs and Table 1 -Ownership and Size of the Project Parcels). Royal Gold, LLC leases and operates on the sixteen parcels.

Gary & Virginia Island, PO Box 567, Boonville, CA 95415-0567
RGolden Holdings, LLC, 4288 Lentell Road, Eureka, CA 95503
Blue Lake Forest Products, Inc., 5211 Morning Dew Way, Redding, CA 96001
North Coast Railroad Authority, 419 Talmage Road, Suite M, Ukiah, CA 95482

3. Site Description

The soil operation facility on the sixteen separate parcels is on the north side of Glendale Drive, totaling approximately 46 acres (see Table 1 - Ownership and Size of Project Parcels). The soil operation facility boundary encompasses approximately 34 acres of these parcels (see Figure 3 – APNs). Portions of seven parcels, APNs 516-101-040, -063, -064, -068, -083, -084, and 516-111-062, are outside the facility boundary. In total, approximately 12 acres of the seven parcels are not within the facility boundary. The project's location is: SW ¼, Section 13, T6N, R1E, H.B. & M. Arcata North 7.5-min USGS quad sheet. Lat. 40 54' 03", Long. 124 01'19". Elevations at the project site vary from approximately 90 – 125 feet NAVD.

Table 1: Ownership and Size of Project Parcels

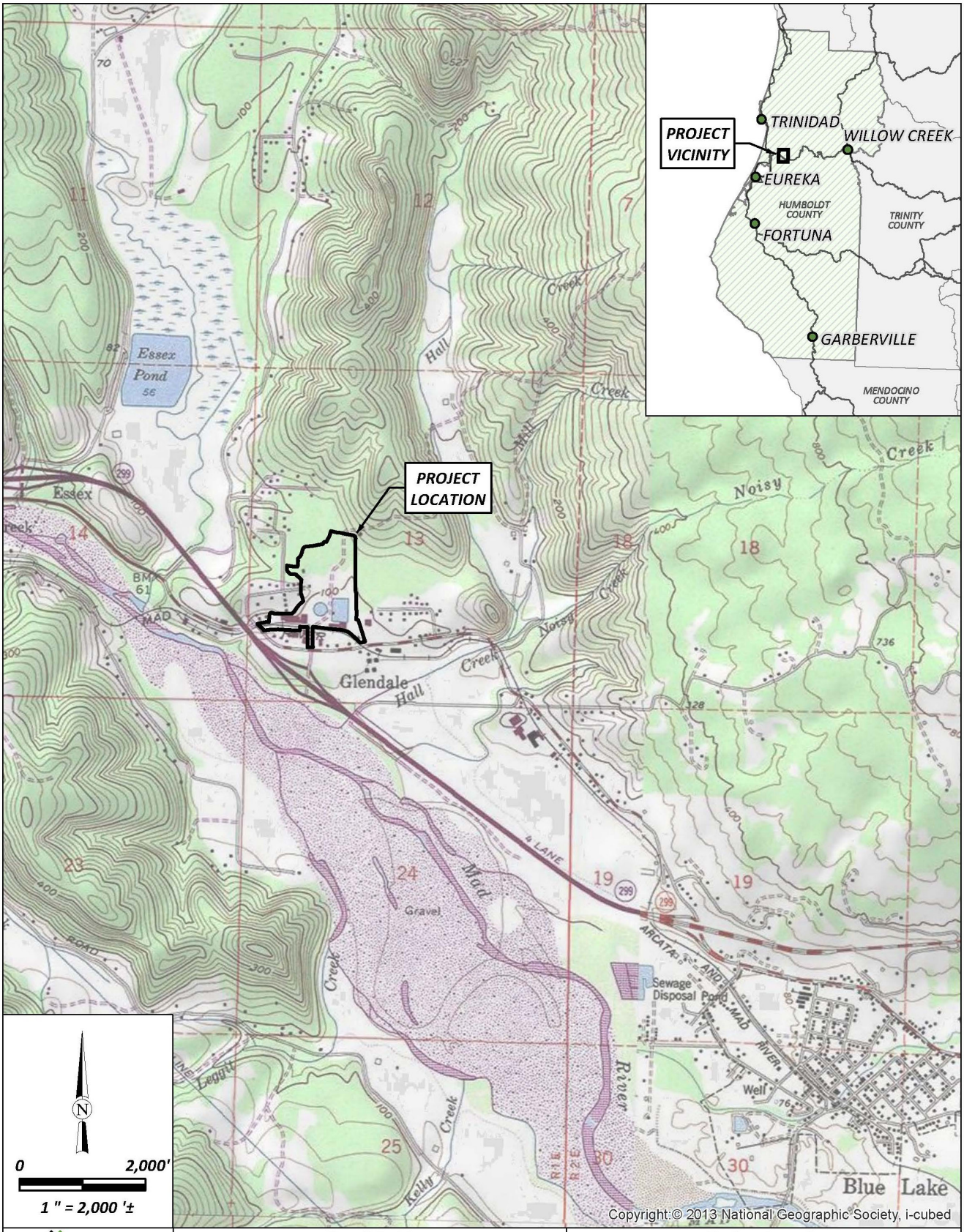
Assessor's Parcel Number	Property Owner	Parcel Size
516-101-005	North Coast Railroad Authority	0.79
516-101-008	RGolden Holdings LLC	0.79
516-101-017	RGolden Holdings LLC	1.83
516-101-040	RGolden Holdings LLC	9.25
516-101-041	RGolden Holdings LLC	0.19
516-101-060	Blue Lake Forest Products Inc	0.89
516-101-063	RGolden Holdings LLC	1.32
516-101-064	RGolden Holdings LLC	0.79
516-101-068	RGolden Holdings LLC	1.40
516-101-079	Gary & Virginia Island	1.44
516-101-081	RGolden Holdings LLC	0.82
516-101-083	Gary & Virginia Island	2.62
516-101-084	RGolden Holdings LLC	4.99
516-111-003	North Coast Railroad Authority	0.33
516-111-062	RGolden Holdings LLC	17.83
516-111-063	Blue Lake Forest Products Inc	0.70

Additionally, Royal Gold was previously using APN 516-111-064 for the storage of raw material (palletized, sealed, and covered), including peat and coco. This parcel is owned by Michael Brosgart and is located directly east of the Royal Gold facility (~250 feet), on the north side of Glendale Drive. This parcel is separated from the Royal Gold facility by another parcel (APN 516-111-066) with a mechanic shop, trucks, and trailers. The use of APN 516-111-064 was temporary and has now ceased. Royal Gold proposes to pave additional area in the northeast corner of their facility to store this material.

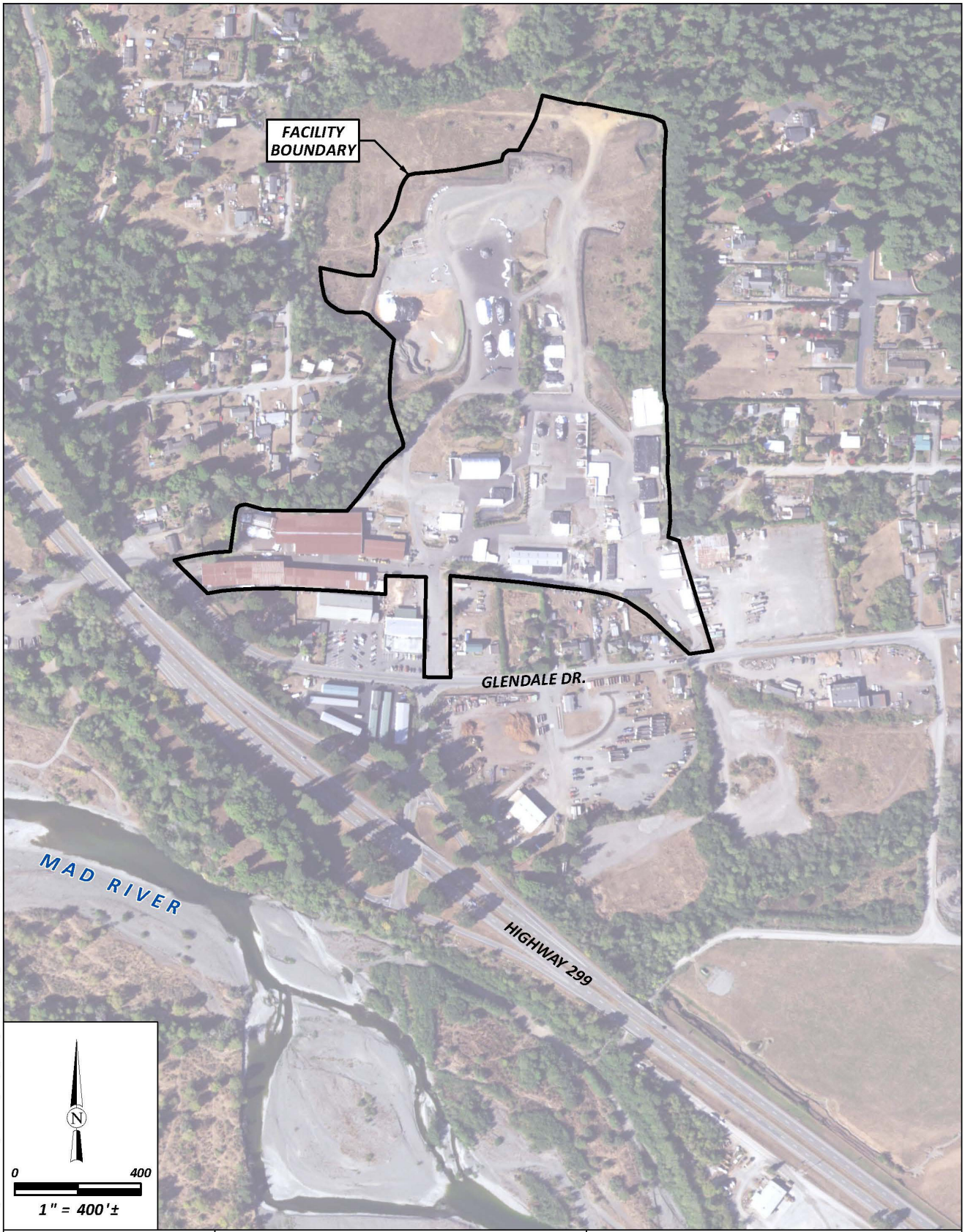
The existing access road entrances and exits to the facility are located off Glendale Drive (Co. Rd. No. 4L765) and are approximately 40-60 feet in width. The primary entrance/exit at the site is in the central southern portion of the facility through APN 516-101-008. There are also two additional exits in the southwestern and southeastern corners of the facility on APNs 516-101-079 and 516-111-062 (see Figure 3 - APNs). The primary entrance/exit of the facility is less than 500 feet from the Highway 299 on/off ramps.

4. Lead Agency Information

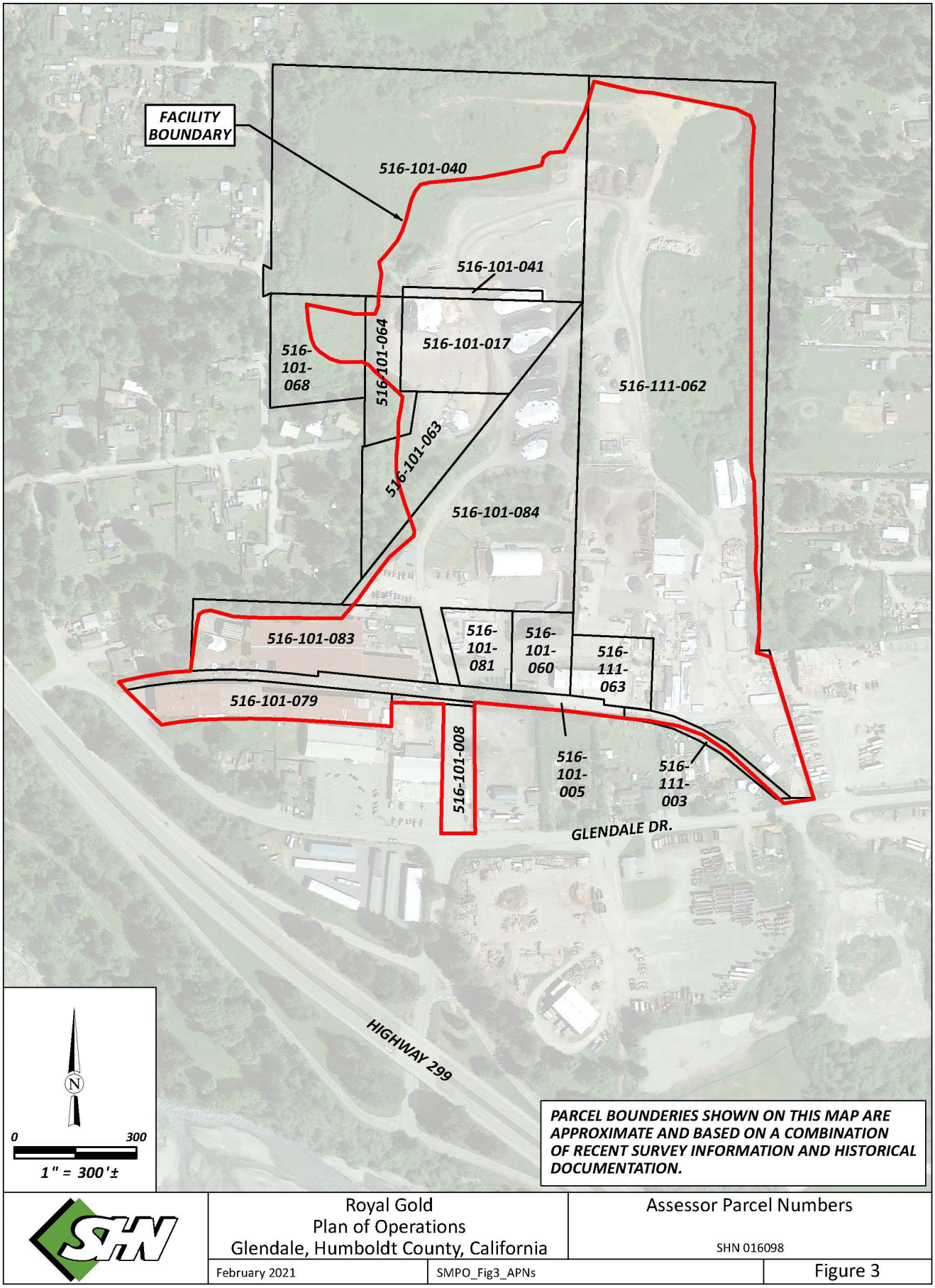
Humboldt County Planning and Building Dept.
Attn: Steve Lazar, Senior Planner
3015 H Street, Eureka, CA 95501
(707) 268-3741, FAX (707) 268-3730
slazar@co.humboldt.ca.us



SHN	Royal Gold Plan of Operations Glendale, Humboldt County, California	Project Location SHN 016098
	February 2021 | SMPO_Fig1_ProjectLocation	Figure 1



SHN	Royal Gold Plan of Operations Glendale, Humboldt County, California	Project Area SHN 016098
	February 2021 | SMPO_Fig2_ProjectArea	Figure 2



SHN	Royal Gold Plan of Operations Glendale, Humboldt County, California	Assessor Parcel Numbers SHN 016098
	February 2021 | SMPO_Fig3_APNs	Figure 3

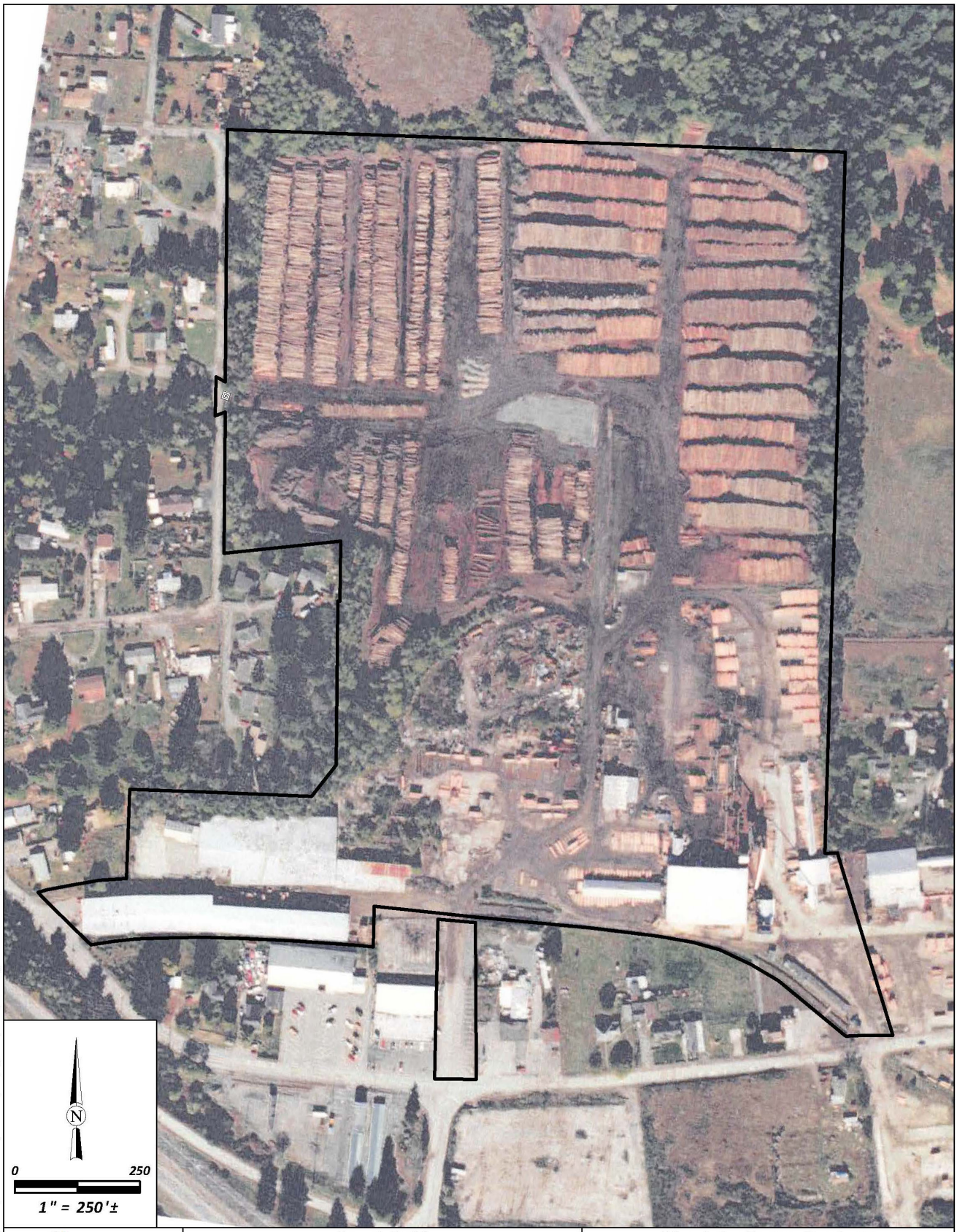
II. PLAN OF OPERATIONS

1. Background

The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1950s. The western portion of the site (APNs 516-101-079 and -083) was historically used for lumber mill operations by Bonnie Stud Mill, Trend Industries, and ICM Lumber Company. The eastern portion of the site (APNs 516-101-008, -017, -040, -041, -060, -063, -064, -068, -081, and -084, and 516-111-062 and -063) was historically used for lumber mill operations under several different owners from the 1950s to 2002. The eastern portion of the site was operated by Molalla Forest Products, Inc. from approximately the 1950s to March 1969, when it was purchased by the Simpson Timber Company. Simpson did not operate the site and sold it to McNamara & Peepe (M&P) in May 1969. M&P operated on the site from 1969 to May 1984 when the company filed for bankruptcy. Blue Lake Forest Products, Inc. began operation at the site in 1986, and ceased operations in April 2002, when the company also filed for bankruptcy. After Blue Lake Forest Products, Inc. ceased operations, Gess Environmental conducted a greenwaste recycling and composting operation on the eastern portion of the site for several years prior to moving closer to Arcata. Prior industrial use of the site is shown in Figure 4 – Blue Lake Forest Products Historic Aerial Photo (Unknown Date), which is an aerial photo of the site when it was operated by Blue Lake Forest Products.

Royal Gold, LLC has been in operation since 2005, and has been operating at the project site since March 2009. Figure 5 – Project Site in Baseline Year (2009) shows the condition of the project site in 2009 when Royal Gold moved to the site. Since beginning operations at the site, Royal Gold has expended substantial capital investments to restore the site and remove remnant debris and equipment from past industrial uses. In addition, Royal Gold has installed security fencing, gates, and cameras to keep trespassers off the property due to problems with theft, vandalism, and various other criminal activities, which were prevalent on this vacated mill site prior to the company's use of the site. Royal Gold applied for an after-the-fact Conditional Use Permit in 2013 and received approval from the Humboldt County Planning Commission in August 2016. The description of the project in the Notice of Planning Commission Decision (dated August 5, 2016) stated the following:

"*A Conditional Use permit (CUP) is being sought by the applicant (Royal Gold, LLC) to allow manufacturing and distribution of potting soil within an approximately 18.9-acre area spread across multiple parcels in the Glendale area...The Conditional Use Permit seeks to bring into compliance the existing soil manufacturing operation and allow expansion from approximately 60,000 cubic yards of annual production to 100,000 cubic yards, as well as placement of a new 7,800 square foot building. The proposed membrane structure utilizes an arched truss design and will be placed over an area where stockpiles of material are currently stored and utilized for similar activities. Coco pith is used as the basis for their soil products, though other components include: sawdust, compost, chicken manure, and fish bone. All of the materials used are imported and then processed at the project site. Daily operation primarily involves the importing of organic materials, grinding, screening, sorting, stockpiling, mixing, packaging, and distribution of the final soil product*."



	Royal Gold Plan of Operations Glendale Dr., Humboldt County, California	Blue Lake Forest Products Historic Aerial Photo (unknown date) SHN 016098
	September 2021 | SMPO_Fig4_BLFPHistoricAerial	Figure 4


Lat: 40.904486
Long: -124.022949
Lat: 40.901205
Long: -124.016283
EXPLANATION
OUTER PROPERTY BOUNDARY
N
0
200
PHOTO SOURCE:
GOOGLE EARTH, 2009
1 " = 200 '±
Royal Gold
Plan of Operations
Glendale Dr., Humboldt County, California
Project Site in Baseline Year
(2009)
SHN 016098
September 2021
SMPO_Fig5_ProjectSiteBaselineYr2009
Figure 5

Humboldt Baykeeper, a local non-profit organization, appealed the Commission's approval. Sometime later, Humboldt Baykeeper sued Royal Gold in federal court under the Clean Water Act. Royal Gold and Baykeeper settled the lawsuit in 2017. The primary issues raised in the appeal of the Planning Commission's approval of the Royal Gold Conditional Use Permit related to biological resources, stormwater runoff, and hazardous materials. To address the concerns raised in the appeal, Royal Gold has hired qualified professionals to prepare a number of technical reports and plans including, but not limited to, a Wetland Delineation (SHN, 2018), Wetland Mitigation and Monitoring Plan Addendum 1 (SHN, 2020), updated Stormwater Pollution Prevention Plan (SWPPP; SHN, 2021a), Biological Report including biological surveys (SHN, 2021b), Soil and Groundwater Management Plan (SHN, 2021c), and the characterization of soils excavated for stormwater improvements (SHN, 2017). Royal Gold has also worked diligently to improve its stormwater management practices to comply with the requirements of the State Water Resources Control Board (SWRCB) Industrial General Permit (IGP) and the settlement agreement with Humboldt Baykeeper. Royal Gold has installed numerous stormwater improvements, which have resulted in a significant reduction in the pollutant concentrations detected in stormwater discharging from the facility. In addition, Royal Gold has improved its operations to reduce impacts related to fugitive dust generation, odors, noise, and lighting. These efforts have occurred in close coordination with local, state, and federal regulatory agencies with jurisdiction over the company's activities.

This revised Plan of Operations is being submitted as part of the Conditional Use Permit process to provide an update on the expansion and improvements at the Royal Gold facility, as well as to identify future improvements proposed at the facility. As discussed in the sections below, Royal Gold has identified additional permit/approval types required from the County for its existing and proposed operations. These include:

- Special Permit: A Special Permit is required for activities within Streamside Management Areas (SMAs) at the Royal Gold facility. These activities include the filling of wetlands, the conversion of wetlands to stormwater features, encroachments into SMAs, and a proposed wetland mitigation area to mitigate for existing and proposed wetland impacts. As required, Royal Gold is coordinating with applicable state and federal agencies (for example, United States Army Corps of Engineers (USACE), North Coast Regional Water Quality Control Board (NCRWQCB), and California Department of Fish and Wildlife (CDFW)) to obtain permits for these activities.
- Other Regulations for Uses Permitted with a Use Permit: Some of the newly constructed and proposed buildings at the Royal Gold facility will require exceptions to the development standards of the U Zone (Unclassified Zone, https://humboldt.county.codes/Code/314-8) and County's Fire Safe Regulations (for example, Section 3115-2, setback for structure defensible space; Humboldt County, 1991). Exceptions may be required for standards including, but not limited to, setbacks from property lines, distance between major buildings, and maximum ground coverage. As discussed further in Chapter II.2 – General Plan and Zoning, Chapter II.3 – Existing Operations/New Improvements, and Chapter II.4 – Proposed Improvements/Operational Changes, one of the primary justifications for the request for exceptions is based on the fact that the Royal Gold facility is operated as one site, even though it includes several parcels.

- Parking Exception Petition: The number of off-street parking spaces required by Section 314-109.1 of the Humboldt County Zoning Regulations significantly exceeds the number of spaces needed for the Royal Gold facility. For this reason, Royal Gold is requesting an exception to the number of parking spaces required pursuant to Section 109.1.2.12 of the Humboldt County Zoning Regulations. As discussed further in Chapter II.11 – Transportation and Parking/Loading Plan, the justification for the exception is based on the number of projected employees at full build out and the levels of anticipated use.

The appeal of the Planning Commission's approval of the Conditional Use Permit in August 2016 has yet to be heard by the Board of Supervisors. Based on the existing and proposed improvements that were not previously considered by the Planning Commission, the identification of new project impacts and mitigations, and the additional permit types required for these activities, it is recommended that the Board of Supervisors forward the revised application to the Planning Commission for review.

2. General Plan and Zoning

According to the Humboldt County Planning Department, in the 1965 Northern Humboldt General Plan, the project parcels had land use designations of Commercial Diagrammatic, Dispersed Housing, and Grazing. This was despite the fact that the project parcels had been used for industrial uses since at least the 1950s. Although the project parcels were not designated for industrial uses, it was determined through previous application approvals that industrial uses were consistent with the Commercial Diagrammatic designation. As stated in the staff report (page 3) for the ICM Lumber Company Conditional Use Permit (CUP-32-86), which allowed a wood remanufacturing plant to occur on APN 516-101-079,

> "*The Northern Humboldt General Plan designates this area as Diagrammatic Commercial. Staff believes this project may be found consistent with this designation based upon the Plan's principles of "encouraging the grouping of urbanizing developments into unified residential, commercial, and industrial uses." This site has historically been in industrial use by Bonnie Stud Mill and Trend Industries*."

In Volume I: Framework Plan of the prior Humboldt County General Plan (1984), the communities of Glendale and Fieldbrook were targeted for preparation of a Community Plan. A draft of the Community Plan was developed in January 2006 by the Fieldbrook-Glendale Community Services District (FGCSD), whose boundaries mostly coincide with the Community Planning Area mapped under the Framework Plan. However, the draft Community Plan was never adopted by the County and the Framework Plan did not address the project site due to its inclusion in the Fieldbrook-Glendale Community Plan Area.

In October 2017, Humboldt County adopted an update of its General Plan. Through the update, General Plan designations were assigned to the project parcels, which are shown in Table 2 – General Plan Designations for Project Parcels. As indicated in Table 2, no designation was applied to the parcels owned by NCRA, which consist of portions of the Annie and Mary railroad right-of-way. As shown in Table 2, twelve out of the sixteen parcels that contain the project site were

designated Industrial General (IG), which is consistent with the existing Royal Gold soil manufacturing facility. However, despite the historic and existing use of the properties, APN 516-101-040 was designated Residential Low Density (RL) and APN 516-101-083 was designated Mixed Use (MU). Because Royal Gold has been using the project parcels for industrial type uses since before the adoption of the General Plan Update, and applied for a Conditional Use Permit in 2013, the Royal Gold soil operation could be considered a pre-existing use on APNs 516-101-040 and 516-101-083 (see Figure 3 – APNs). Additionally, Royal Gold was previously using APN 516-111-064 for the storage of raw material (palletized, sealed, and covered) including peat and coco. The use of this property was temporary and has now ceased. Royal Gold proposes to pave additional area in the northeast corner of their facility to store this material.

Table 2: General Plan Designations for Project Parcels

Assessor's Parcel Number	General Plan Designation
516-101-005	No designation (NCRA right-of-way)
516-101-008	Industrial General (IG)
516-101-017	Industrial General (IG)
516-101-040	Residential Low Density (RL)
516-101-041	Industrial General (IG)
516-101-060	Industrial General (IG)
516-101-063	Industrial General (IG)
516-101-064	Industrial General (IG)
516-101-068	Industrial General (IG)
516-101-079	Industrial General (IG)
516-101-081	Industrial General (IG)
516-101-083	Mixed-Use (MU)
516-101-084	Industrial General (IG)
516-111-003	No designation (NCRA right-of-way)
516-111-062	Industrial General (IG)
516-111-063	Industrial General (IG)

The parcels comprising the Royal Gold facility are all currently zoned Unclassified (U). The purpose of the U Zone, as stated in Section 314-8.1 of the Humboldt Zoning Regulations is the following:

> "*As provided in this Code, all of the unincorporated area of the County not otherwise zoned is designated as the Unclassified or U Zone. This area has not been sufficiently studied to justify precise zoning classifications. The following Code sections have been adopted to protect the health, safety and general*

welfare of the citizens and to insure orderly development in conformance with the General Plan."

The U Zone only allows a limited number of land uses as principally permitted (allowed by right with no discretionary review), which includes single-family residences, general agriculture, rooming, boarding of not more than two (2) persons, and manufactured homes. All other uses may be permitted upon the granting of a Use Permit. For this reason, an after-the-fact Conditional Use Permit was required for the Royal Gold soil operations.

Under the section entitled "*Other Regulations for Uses Permitted with a Use Permit*", the U Zone allows exceptions to development standards such as setbacks, ground coverage, distance between major buildings, etc. with the review and granting of a Conditional Use Permit. As stated in this section of the U Zone regulation, "*The building height, site area, setbacks and other requirements for all other uses shall be as required by the Planning Commission in the granting of a Use Permit*." As noted above in Chapter II.1 – Background, some of the newly constructed and proposed buildings at the Royal Gold facility will require exceptions to the development standards of the U Zone regulations and Fire Safe Regulations (for example, Section 3115-2). Exceptions may be required for standards including, but not limited to, setbacks from property lines, distance between major buildings, and maximum ground coverage. The development standards required in the U Zone are listed in Table 3.

Table 3: Unclassified (U) Zone Development Standards

Development Standard	Requirement
Front yard setback	Twenty feet (20')
Side yard setback	Five feet (5')
Rear yard setback	Ten feet (10')
Distance between major buildings	Twenty feet (20')
Maximum ground coverage	Forty percent (40%)
Maximum building height	None specified

In addition to the U Zone development standards, Section 3115-2 of the County Fire Safe Regulations also requires that all parcels one (1) acre and larger shall meet a minimum 30-foot setback for buildings and accessory buildings from all property lines and/or the center of a road. For parcels less than one (1) acre, the County shall provide for the same practical effect, which is further defined in the regulations.

As shown in Figure 3 – Assessor's Parcel Numbers, the Royal Gold site is composed of sixteen separate parcels operating as one facility. The existing metal buildings from past industrial uses do not comply with some of the development standards in the U Zone or the Fire Safe Regulations. The newly constructed and proposed buildings included in this revised Plan of Operations would also be located in areas of the project site that do not meet the development standards in the U Zone or the Fire Safe Regulations. The exceptions being requested from the development

standards are primarily for setbacks required from internal parcel property lines that exist within the facility boundary. In addition, there is limited vegetation within the facility boundary that would necessitate maintaining defensible space. The new buildings being proposed will be constructed of materials that are fire resistant, including metal and cinder blocks. The specific exceptions that are anticipated to be required for each building are discussed further in Chapter II.3 – Existing Operations/New Improvements and Chapter II.4 – Proposed Improvements/Operational Changes.

Humboldt County is currently in the process of updating its Zoning Classifications for consistency with the recent General Plan Update. As noted above, though developed with industrial uses for decades, the zoning of the project parcels and much of the Glendale area is currently Unclassified (such as, U Zone). Through the update of the County's Zoning Classifications, the project parcels will be rezoned for consistency with the recently adopted General Plan Designations (see Table 2).

3. Existing Operations/New Improvement

a. Existing Operations

Royal Gold currently uses this historic industrial site to manufacture and distribute potting soil and fertilizer products. Royal Gold operates year-round, with operating hours between 7 a.m. and 7 p.m., Monday through Saturday. Royal Gold has a total of 72 employees and 60 of these employees work at the facility in Glendale. The remaining employees work in the company's Arcata office and in other states.

The operation primarily involves the blending and mixing of potting soils, raw material processing, and shipping and receiving activities. The majority of mixing and bagging activity currently takes place in the existing pole shed-style metal buildings in the southwest portion of the facility on APNs 516-101-079 and 516-101-083.

Typical equipment used for the processing and distribution activities includes a horizontal grinder, trommel screener[1], bale buster, front-end loaders, dump trucks, forklifts, mixing lines, bagging lines, generators, and hauling trucks. Auxiliary equipment necessary for other operations of the facility (in addition to processing and distribution) includes a skid steer, mini-excavator, water trucks, street sweepers, vacuum trailer, and a light-duty tractor.

The materials used to produce soil and fertilizer products are imported and then processed at the project site. The soil products are primarily packaged in 0.75-, 2-, and 3-cubic-foot bags and 1- and 2-cubic-yard totes. Bulk soil is also available by dump truck loads upon request. The fertilizer products are primarily packaged in 5-, 10-, 20-, and 40-pound bags and a 1,000-pound tote.
Basic operations at Royal Gold include receiving and blending raw and commercially-produced materials to create potting soil mixes. A description of how these materials are handled to produce the soil products is provided below. The materials used for the fertilizer products are similar to the amendments used in the soil products.

[1] A trommel screener is a type of sorting machine that is widely used in aggregate production and other industrial fields.

Coconut Fiber Processing: Coconut fiber is made from dried and ground coconut husks. It is delivered as compressed bricks that are stacked and wrapped on a pallet. The compressed bricks of fiber are rehydrated and processed for use in the soil mixes.

Forest Humus Processing: Sawdust is received from multiple local sources and is stored in several large piles, which are kept tarped until ready to use. The piles are screened prior to use in soil production. Larger material that is screened out and not reprocessed on site is donated to various outlets.

Peat Processing: Peat is delivered in compressed bales and processed through an industrial bale buster where the material is expanded to be ready for use in soil production.

Coco Chip Processing: Coco chips are cut, but not ground, coconut husk fibers that are dried, compressed, and delivered on pallets wrapped in plastic. Coco chips are rehydrated and used in soil production.

Compost Handling Procedure: OMRI[2] certified organic compost is delivered to the site and stored in an existing metal building on APNs 516-101-060 and 516-111-063. Compost piles are turned once a week or as necessary to maintain quality. This product comes fully processed and is ready to use in soil production.

Perlite: Flatbed trucks deliver stacked totes of perlite. Totes are stored until they are used in soil production.

Lava Rock: Bulk lava rock is delivered by a truck and transfer trailer and stored until used in soil production.

Amendments: Amendments are delivered in either pallets of bagged material or bulk totes and stored under cover until ready for use in soil production.

Bagging Line Mixing Detailed Description: Bagged soil is mixed in automated mixing lines and bagged in either automated or manual bagging lines. The mixing lines include a series of computer-controlled hoppers that blend all raw materials. Ingredients are placed into hoppers by front-end loader or by hand, within covered structures and on paved surfaces. Amendments are applied by the hoppers to the mixing line in a fully enclosed dust hut where they are incorporated into the soil substrate. The automated line feeds and mixes the ingredients to product specifications. A bagging hopper then feeds soil through a bag chute, where the bags are filled, sealed, flattened, and palletized. The pallets are covered with a topper, wrapped in shrink wrap, and stored under cover until they are ready for shipment. During shipping, packaged product is loaded onto flatbed or enclosed semis for distribution.

Bulk Mixing Detailed Description: For the production of bulk soil products (bulk totes and loose bulk), ingredients are piled together on a paved surface and blended gently with a front-end

[2] Organic Materials Research Institute, OMRI®

loader in the bulk soil yard in the central portion of the facility (see Figure 6 – Site Plan). After being mixed, bulk soil for totes is loaded into the bulk tote hopper, where it is fed by conveyor to a chute used to fill the totes. Finished totes are stacked on pallets and banded to ensure they do not shift or fall over during shipping via flatbed or container semis. The bulk soil that is to be sold loose is stored in piles and covered with tarps until it is ready to be shipped out via covered dump truck.

Fertilizer Production: For the production of Royal Gold's fertilizer line, ingredients are processed, measured, mixed, and fed into an auger system that leads to the bagging line. Bags are filled, sealed, and placed into boxes which are then stacked, palletized, and covered for storage before shipping out for distribution.

b. New Improvements

Since the Planning Commission approval of the Conditional Use Permit in August 2016, Royal Gold has constructed several site improvements, which are discussed further below. These improvements are shown in Figure 6 – Site Plan. This revised Conditional Use Permit application includes after-the-fact approval of these newly constructed improvements, as applicable.

- Building A: An approximate 7,800-square-foot (65-foot by 120-foot) building was constructed in the southeast corner of APN 516-101-084 on an existing concrete pad (see Figure 3 – Assessor's Parcel Numbers and Figure 6 – Site Plan). As noted in Chapter II.1 – Background, this building was proposed as part of the Conditional Use Permit application approved by the Planning Commission in 2016. This building has an arch truss design and is constructed of galvanized steel trusses and a polyethylene fabric cover. The building is located on a portion of APN 516-101-084 that complies with the setback requirements in the U Zone and the Fire Safe Regulations. The current and proposed use for this building is coconut fiber processing and storage. The processing equipment used in this building includes a horizontal grinder with a diesel engine regulated by the North Coast Unified Air Quality Management District (NCUAQMD) (refer to Chapter II.6) and auxiliary equipment. This equipment is operated with a generator (maximum 40.2 horsepower), as electric service is not currently available in this portion of the site.
- Building B: An approximate 4,380-square-foot (60-foot by 73-foot) building was constructed in the southwest corner of APN 516-111-062 (see Figure 3 – Assessor's Parcel Numbers and Figure 6 – Site Plan). This building was not previously proposed as part of the Conditional Use Permit application approved in August 2016. This building, like Building A, has an arch truss design and is constructed of galvanized steel tube trusses and a polyethylene fabric cover. Based on the location of the building, it appears that it may cross the property line between APNs 516-111-062 and 516-111-063. Royal Gold is in the process of having this property line surveyed to determine if this is the case. If Building B is shown to cross over the property line, potential options for resolving this issue could be to apply for a Lot Line Adjustment or to relocate the building. The current and proposed use for this building is for peat processing using a bale buster. The processing equipment that is used in this building is operated with a generator (maximum 40.2 horsepower), as electric service is not currently available in this portion of the site.

- Addition to amendment storage building: A metal lean-to-type structure addition (fully enclosed) was constructed on the small metal building in the northwest corner of APN 516-101-083. This building was previously used for amendment storage as labeled on the Site Plan in the Conditional Use Permit application approved in 2016. Since construction of the addition to this building, it is now used for the processing and packaging of a dry fertilizer line called "Crown Jewels" (see Figure 6- Site Plan).
- Fueling station: A fueling station was installed under the pole-shed-type structure in the southeastern portion of APN 516-101-083. The fueling station is used for providing fuel (such as, gasoline, diesel, and propane) to the off-road heavy equipment used at the facility. The tanks at the fueling station are aboveground and include:
    - Two (2) five-hundred-gallon, double-wall steel tanks on steel saddles
    - One (1) 110-gallon single-wall steel tank with a plastic secondary containment
    - One (1) 200-gallon propane cylinder that is used to fill the fuel tanks for the forklifts
- Generators: Several generators are used at the site to operate equipment in areas where electric service is not available. As noted above, generators are currently used in Buildings A and B. In addition, generators are used as the energy source for bulk tote packaging on the eastern portion of the site and for power tools used for maintenance activity in various portions of the site. As discussed in Chapter II.4 – Proposed Improvements/Operational Changes, the generators will not be required when electric service is connected to the remaining portions of the site. The generators currently used at the site include:
    - 2,000-watt Generac gasoline generator – Model: IQ2000, 2.7 hp
    - 3,000-watt Honda gasoline generator – Model: EU3000is, 4 hp
    - 7,000-watt Honda gasoline generator – Model: EU7000is, 9.4 hp
    - 20 kW Whisperwatt diesel generator – Model: DCA-25SSIU4F, 40.2 hp
    - 20 kW PowerPro diesel generator – Model: SDG25S, 31.5 hp
- Stormwater improvements: Numerous stormwater improvements have been constructed throughout the site to comply with the requirements of the SWRCB IGP and the settlement agreement with Humboldt Baykeeper. These improvements are identified in the current SWPPP for the facility (SHN, 2021a).
- Paving: Several portions of the project site have been paved to improve site access and stormwater management, provide additional areas for the storage of materials, minimize fugitive dust, and address concerns about disturbing onsite soils. Some of these paving activities were completed as part of the settlement agreement with Humboldt Baykeeper.
- Filling of wetlands: As discussed in the Wetland Mitigation and Monitoring Plan Addendum 1 (SHN, 2020) prepared for the Royal Gold facility, approximately 0.83 acres (36,155 square feet) of Clean Water Act "jurisdictional wetlands" have been determined to have been impacted at the site. The majority of these former wetlands (0.73 acres or 31,799 square feet) were located in the central portion of the site and were converted into stormwater detention basins to comply with the Clean Water Act. The remainder of these wetlands (0.10 acres or 4,356 square feet) were filled for use as paving, parking, storage, and coco processing. As discussed below in Chapter II.4 – Proposed

Improvements/Operational Changes, these wetland impacts will be mitigated through construction of a wetland mitigation area in the northwestern portion of the site on APNs 516-101-040, -064, and -068. A Special Permit will be required for the jurisdictional wetlands, encroachments into SMAs, and the wetland mitigation area. Royal Gold is coordinating with state and federal agencies (for example, USACE, NCRWQCB, and CDFW) for the necessary permits.

- Construction of berms: As shown on Figure 6 – Site Plan, several earthen berms have been constructed in the northern portion of the site to minimize noise and fugitive dust impacts. The berms were constructed using imported fill and aggregate material.
- Security fencing: Chain link security fencing (6-foot height) was installed on the southern portion of the site where the majority of equipment and finished product are stored. This was done to mitigate trespassing, vandalism, and theft at the Royal Gold facility.
- Portable office buildings: Two portable office buildings have been rented and are located on the eastern edge of APN 516-101-079, adjacent to the existing pole-shed-style metal building. It is anticipated that these portable structures will only be onsite temporarily, in response to the current COVID-19 pandemic. For this reason, they are not shown on the Site Plan. As discussed in Chapter II.4 – Proposed Improvements/Operational Changes, it is eventually proposed to construct a new building or expand the existing building at this location.

4. Proposed Improvements/Operational Changes

As part of the revised application for a Conditional Use Permit, Royal Gold is proposing several new buildings, additional utility infrastructure, and other related improvements to accommodate the needs of its growing business. Several of these improvements are shown as proposed on Figure 6 – Site Plan and are described further below. In addition to the proposed improvements, Royal Gold is also proposing operations on Sundays from 8 a.m. to 6 p.m.

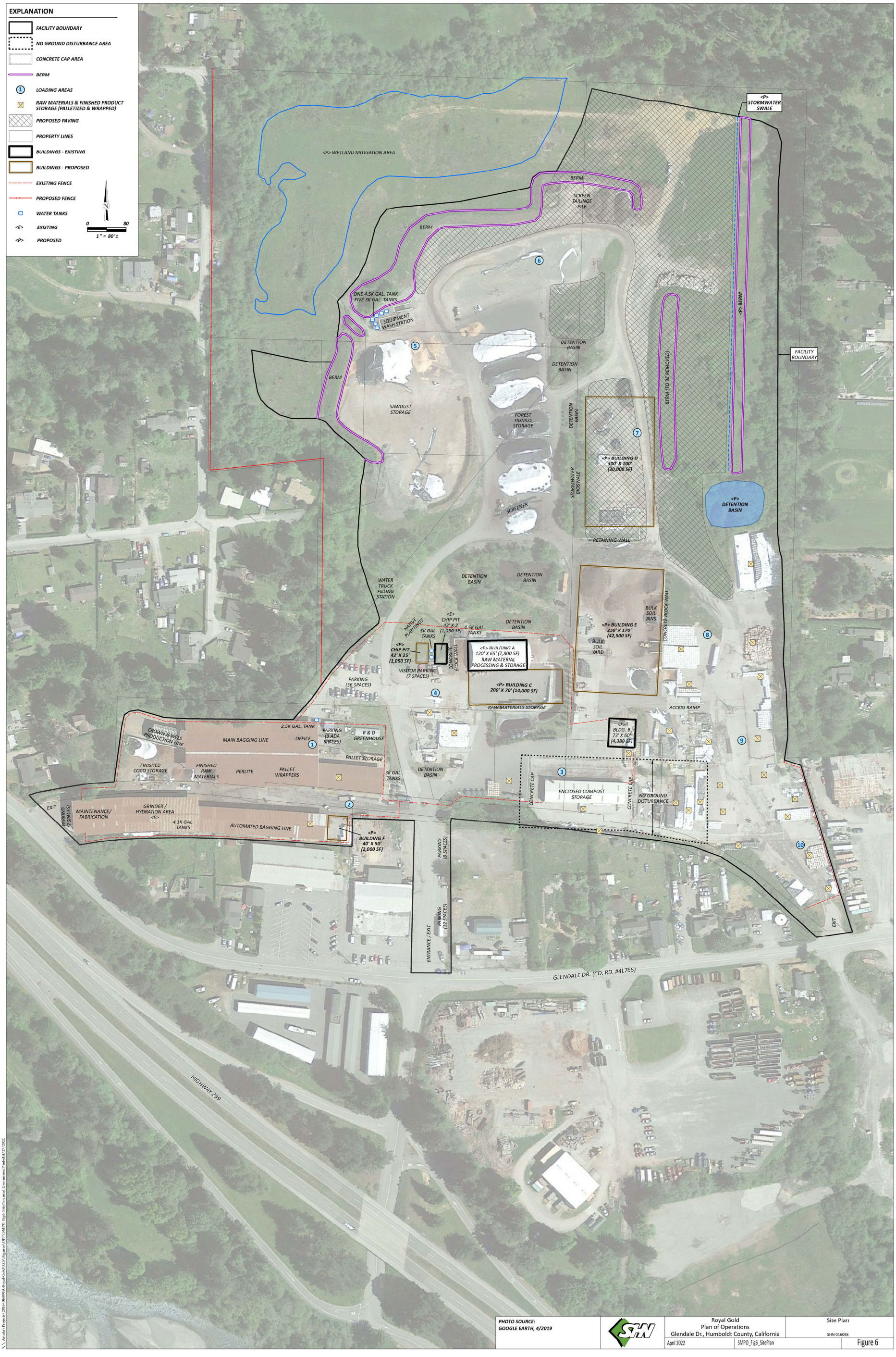
- Paving: Pavement of additional areas in the northern portion of the site is proposed to improve site access and stormwater management, provide additional areas for the storage of materials, minimize fugitive dust, and address concerns about disturbing onsite soils (see Figure 6 – Site Plan).
- Electric utility infrastructure: Installation of electric utility infrastructure is proposed to serve the new buildings at the site that were constructed after the Conditional Use Permit approval in August 2016. These buildings are labeled as Buildings A and B on Figure 6 – Site Plan. As previously noted, these existing buildings are used for coconut fiber processing (Building A) and peat processing (Building B). Once electricity is provided, these buildings will continue to be used for coconut fiber and peat processing, and equipment currently operated using generators will be connected to the electrical service.
- Building C: Construction of an approximately 14,000-square-foot (200-foot by 70-foot) building directly south of Building A and associated utility infrastructure (for example, electricity, water, etc.; See Figure 6 – Site Plan). This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it would require exceptions to the setback requirements in the Fire Safe Regulations, due to internal

parcel lines. Building C is proposed to be used for the storage and processing of coconut fiber.

- Building D: Construction of an approximately 30,000-square-foot (100-foot by 300-foot) building in the central northern portion of the site and associated utility infrastructure (for example, electricity, water, etc.; See Figure 6 – Site Plan). This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it is located on a portion of APN 516-111-062 that may require an exception to the setback requirement in the Fire Safe Regulations, due to internal parcel lines. Building D is proposed to be used for the storage and processing of various raw and finished materials.
- Building E: Construction of an approximately 42,500-square-foot (250-foot by 170-foot) building and associated utility infrastructure (for example, electricity, water, etc.) in the central portion of the site in the area currently used as the bulk soil yard. This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it is located on a portion of APN 516-111-062 that may require an exception to the setback requirement in the Fire Safe Regulations, due to internal parcel lines. This building would be used for the processing, storage, and packaging (as applicable) of soil material, as is currently occurring in this area of the site. If electric service is not yet available from PG&E at the time that construction of the building is completed, electricity to the building is proposed to be supplied with a 160 kW generator.
- Building F or Addition to Existing Building: This improvement would involve either: 1) construction of an approximately 2,000-square-foot (40-foot by 50-foot) two-story building adjacent to the eastern edge of the existing pole-shed-style metal building on APN 516-101-079; or 2) construction of an approximately 2,000-square-foot addition to the eastern portion of the existing pole-shed-style metal building on APN 516-101-079 (see Figure 6 – Site Plan). Both potential options would be constructed of metal. If a new, standalone building is constructed, it appears that it would require exceptions to the requirements for the minimum distance between major buildings and the maximum ground coverage. If an addition to the existing building is constructed, it appears that it would require an exception to the requirements for maximum ground coverage. Both potential options noted above are proposed to be used for bathrooms and offices. The bathrooms would be connected to the Fieldbrook-Glendale Community Services District (FGCSD) sanitary sewer wastewater collection system.
- Fueling station: Construction of a new aboveground fueling station at the facility that would be used for fueling the heavy equipment used onsite. The new fueling station will include a double-wall steel tank for diesel fuel, no larger than 5,000 gallons, that meets UL-2085 standards and all relevant building and fire codes for California. The specific location of the fueling station has not been finalized, but will be located away from waterways and combustible materials as recommended by the National Fire Protection Association (NFPA). The tank will be installed on a concrete pad and a metal structure will be erected above the fuel tank to prevent stormwater from contacting the tank or pumps. A 1,000-gallon propane cylinder is also proposed to be located in the vicinity of the fueling station. It is anticipated that the Royal Gold facility will be regulated as a Tier 1 qualified facility and will comply with requirements of a Tier 1 Spill Prevention, Control, and Countermeasure (SPCC) plan.

- Additional wetland impacts and stormwater improvements:
  As part of full buildout of their facility, Royal Gold is proposing to impact approximately 0.74 acres of additional wetlands in the central eastern portion of the site. This additional wetland area is proposed to be converted to stormwater detention basins or filled and developed as paving, storage areas, stormwater swales, and earthen berms. The additional stormwater improvements are necessary to manage the additional stormwater runoff from the new impervious surfaces proposed in the northern eastern portion of the site (for example, Building D and additional paving). The modified SMA boundaries that would result from the additional wetland impacts and improvements are illustrated in Figure 7 (Site Plan with Streamside Management Areas at Full Buildout) of the Updated Biological Report prepared for the project (SHN, 2021b). A Special Permit will be required for the proposed wetland impacts and encroachments into SMAs. As required, Royal Gold is coordinating with applicable state and federal agencies (for example, USACE, NCRWQCB, and CDFW) to obtain permits for these activities.
- Wetland mitigation area: Construction of a wetland mitigation area in the northwestern portion of the site (APNs 516-101-040, -064, and -068) to mitigate for existing and proposed impacts to wetlands at the site. As discussed in the Wetland Mitigation and Monitoring Plan Addendum 1 prepared for the Royal Gold facility (SHN, 2020), these impacts would be mitigated at a 2:1 ratio, resulting in approximately 3.18 acres (138,520 square feet) of three-parameter wetlands. A Special Permit will be required for the proposed construction of the wetland mitigation area. As required, Royal Gold is coordinating with appropriate state and federal agencies (for example, USACE, NCRWQCB, and CDFW) to obtain permits for these activities.
- New equipment: Use of an electric coir buster[3] for processing of coco bricks is proposed as an alternative to the existing diesel horizontal grinder used at the site. The coir buster may not completely replace the horizontal grinder, but would minimize its use. The coir buster generates lower noise levels than the horizontal grinder, which has the potential to reduce noise levels produced by the processing activity at the facility.
- Security fencing: Installation of chain link security fencing (6-foot height) is proposed around all remaining areas of the facility where equipment or materials are stored. The security fencing may include barbwire or razor wire if it is determined necessary to deter trespassing. This is proposed due to continued trespassing, vandalism, and theft at the Royal Gold facility. The primary focus for security fencing will be along the western boundary of the facility where most of the trespassing occurs by adjacent residents.
- Security lighting: Installation of security/perimeter lighting is proposed around the facility boundary adjacent to existing and proposed security fencing. All lighting fixtures are proposed to comply with the requirements of the International Dark Sky Association (IDA) for reducing waste of ambient light (such as, “dark sky compliant”). This includes, but is not limited to, requirements for acceptable fixture types and maximum color temperature.

[3] Coir is a natural fiber extracted from the husk of coconut and used in products such as floor mats, doormats, brushes, mattresses, etc.


EXPLANATION
FACILITY BOUNDARY
NO GROUND DISTURBANCE AREA
CONCRETE CAP AREA
BERM
LOADING AREAS
RAW MATERIALS & FINISHED PRODUCT STORAGE (PALLETIZED & WRAPPED)
PROPOSED PAVING
PROPERTY LINES
BUILDINGS - EXISTING
BUILDINGS - PROPOSED
EXISTING FENCE
PROPOSED FENCE
WATER TANKS
<E> EXISTING
<P> PROPOSED
N
0
80
1" = 80'±
<P> WETLAND MITIGATION AREA
<P> STORMWATER SWALE
BERM
SCREEN TAILINGS PILE
ONE 4.5K GAL. TANK
FIVE 3K GAL. TANKS
EQUIPMENT WASH STATION
DETENTION BASIN
<P> BERM
FACILITY BOUNDARY
BERM (TO BE REMOVED)
SAWDUST STORAGE
FOREST HUMUS STORAGE
<P> BUILDING D 300' X 100' (30,000 SF)
STORMWATER BIOSWALE
<P> DETENTION BASIN
SCREENER
RETAINING WALL
WATER TRUCK FILLING STATION
NATIVE PLANTINGS
<E> CHIP PIT 42' X 2 (1,050 SF)
5K GAL. TANKS
4.5K GAL. TANKS
<P> CHIP PIT 42' X 25' (1,050 SF)
CONCRETE BLOCK WALL
<F> BUILDING A 120' X 65' (7,800 SF) RAW MATERIAL PROCESSING & STORAGE
VISITOR PARKING (7 SPACES)
PARKING (36 SPACES)
<P> BUILDING C 200' X 70' (14,000 SF)
RAW MATERIALS STORAGE
<P> BUILDING E 250' X 170' (42,500 SF)
BULK SOIL BINS
BULK SOIL YARD
ACCESS RAMP
<F> BLDG. B 73' X 60' (4,380 SF)
2.5K GAL. TANK
CROWN JEWELS PRODUCTION LINE
MAIN BAGGING LINE
OFFICE
PARKING (3 ADA SPACES)
R & D GREENHOUSE
PALLET STORAGE
FINISHED COCO STORAGE
FINISHED RAW MATERIALS
PERLITE
PALLET WRAPPERS
3K GAL. TANKS
CONCRETE CAP
ENCLOSED COMPOST STORAGE
NO GROUND DISTURBANCE
EXIT
PARKING (7 SPACES)
MAINTENANCE/ FABRICATION
GRINDER / HYDRATION AREA
<E> 4.1K GAL. TANKS
AUTOMATED BAGGING LINE
<P> BUILDING F 40' X 50' (2,000 SF)
PARKING (8 SPACES)
PARKING (12 SPACES)
ENTRANCE / EXIT
GLENDALE DR. (CO. RD. #4L765)
HIGHWAY 299
PHOTO SOURCE: GOOGLE EARTH, 4/2019
Royal Gold
Plan of Operations
Glendale Dr., Humboldt County, California
Site Plan
SHN 016098
April 2022
SMPO_Fig6_SitePlan
Figure 6

5. Noise

This project, by its relative nature, contributes to ambient noise levels only during periods of operation. Project-related sounds occur year-round and are limited to daytime operations. Royal Gold operates within the hours of 7 a.m. to 7 p.m., Monday through Saturday. As noted above, operations are also proposed on Sundays from 8 a.m. to 6 p.m. Noise sources from the Royal Gold operation occurs from a variety of stationary equipment and mobile equipment/vehicles as described in Chapter II.3 – Existing Operations/New Improvements.

The project site is near Highway 299 (distance to highway varies from approximately 175 feet to 1,000 feet), Glendale Drive, adjacent industrial operations, low-density residential uses, a bowling alley, and Murphy's Market. As such, ambient noise levels have been historically and are currently elevated, though intermittent, in the vicinity of the project site. Noise measurements have been taken at the site periodically since 2012. The measurements have consistently shown Highway 299 to be the predominant ambient noise source in the vicinity of the project site.

Low-density residential development occurs adjacent to the project site (see Figure 2 – Project Area and Figure 6 – Site Plan). The majority of noise-generating activity at the Royal Gold operation currently takes place in the southwest portion of the site on APNs 516-101-079 and 516-101-083. This is where the horizontal grinder and mixing and bagging lines are located. The nearest residential structures to these high-activity areas occur to the west, south, and north. The closest residence to the west is within approximately 40 feet of the western boundary of APN 516-101-083. The closest residence to the south is within approximately 90 feet of the southern boundary of APN 516-101-079. The closest residence to the north is located on a bluff above the project site and is within 120 feet of the northern boundary of APN 516-101-083.

The Humboldt County General Plan Noise Element (Chapter 13) contains noise compatibility standards, which are found in Table 13-C (Land Use/Noise Compatibility Standards). The noise standards in Table 13-C are based on the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (Ldn). CNEL is a 24-hour energy equivalent level derived from a variety of single-noise events, with weighting factors of 5 and 10 dBA applied to the evening (7 p.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods, respectively, to allow for the greater sensitivity to noise during those hours. Ldn is the average sound level in decibels, excluding frequencies beyond the range of the human ear, during a 24-hour period with a 10 dB weighting applied to nighttime sound levels. Since CNEL and Ldn are a daily average, allowable noise levels can increase in relation to shorter periods of time. Table 13-C provides the maximum interior and exterior noise levels by land use category. For single-family residences, 60 dBA CNEL/Ldn is considered a normally acceptable exterior noise level. As stated on page 13-6 of the Noise Element, "*A standard construction wood frame house reduces noise transmission by 15 dBA. Since interior noise levels for residences are not to exceed 45 dBA, the maximum exterior noise level for residences is 60 dBA without requiring additional insulation*." Based on the noise compatibility standards in Table 13-C of the General Plan Noise Element, 60 dBA CNEL/Ldn is used as the noise threshold in the CEQA Initial Study being prepared for the Royal Gold project. If the noise levels generated by the Royal Gold operation are less than 60 dBA CNEL/Ldn at the outdoor activity areas of adjacent residences, then impacts would be less than significant. If the noise levels exceed this standard, then mitigation would be required.

To determine whether the current activities at the Royal Gold soil operation comply with the 60 dBA CNEL/Ldn standard, noise measurements have been taken on several occasions within the last year along the exterior property lines of the facility. The noise measurements were taken along property lines that are shared with residential properties, which occur along the southwest, south, eastern, and western property lines. Several types of noise measurements were taken at the facility ranging from 10-minute Leq measurements to 24-hour CNEL/Ldn measurements. The 24-hour CNEL/Ldn measurements indicated that the stationary equipment activity on APN 516-101-079 exceeds the 60 dBA CNEL/Ldn noise standard by approximately 4 dBA CNEL/Ldn at the residential properties to the south (APNs 516-101-036, -058) and northwest (APNs 516-101-056, -073). APN 516-101-079 contains a pole-shed-style metal building that houses the horizontal grinder and automated bagging line. The horizontal grinder was observed to produce the highest sound levels of the equipment used by Royal Gold. Otherwise, the noise measurements indicated that the operations at the Royal Gold facility comply with the 60 dBA CNEL/Ldn noise standard at the other residential properties around the facility.

Based on the results of the noise measurements taken at the Royal Gold facility, mitigation is required to reduce the sound levels of the stationary equipment on APN 516-101-079 to below the County's noise standard for residential uses. Mitigation options include the following: 1) removal of the horizontal grinder (currently operated from within the pole-shed building on APN 516-101-079) and relocation to the inside of Building A, located in the central portion of the site; 2) conduct all grinding activity from the central portion of the site adjacent to Building A and replace the horizontal grinder with equipment that produces lower sound levels (coir buster); and/or 3) install sound attenuation improvements (for example, walls or sound curtains) having a minimum sound transmission class (STC) rating of 20 along the open sides of the pole-shed building on APN 516-101-079. Table 4 provides estimates of the noise levels that would result from implementation of each of the mitigation options noted above. The estimates regarding relocation of the grinding activity to the central portion of the site are based on noise measurements of the horizontal grinder and a new piece of equipment that is proposed to replace the grinder (coir buster). The estimate of noise level reductions from the installation of sound attenuation improvements is based on a conservative sound level reduction for wall construction or sound curtains with an STC rating of 20 (NAIMA, 1997).

Table 4: Estimated Noise Levels with Noise Mitigation

Mitigation Options	Estimated Noise Level at Closest Residential Property Line (dBA CNEL/Ldn)
Option 1: Relocation of the horizontal grinder to Building A in the central portion of the site	57.8[1]
Option 2: Relocation of grinding activity to the central portion of the site near Building A and replacement of the horizontal grinder with equipment that produces lower sound levels (coir buster)	55.8[2]

Mitigation Options	Estimated Noise Level at Closest Residential Property Line (dBA CNEL/Ldn)
Option 3: Installation of sound attenuation improvements (for example, walls or sound curtains) that have a minimum STC rating of 20 along the open sides of the building on APN 516-101-079	<58[3]

1. The estimate is based on noise measurements taken in March 2021 of the horizontal grinder when it was being operated in Building A (see Figure 6- Site Plan). The measurements were taken adjacent to the closest residential property line (APN 516-101-061) to the grinding activity, which is directly west of Building A.
2. The estimate is based on noise measurements taken in January 2022 of the equipment that is proposed to replace the horizontal grinder (coir buster) when it was being operated directly south of Building A (see Figure 6 – Site Plan). The measurements were taken adjacent to the closest residential property line (APN 516-101-061) to the grinding activity, which is directly west of Building A.
3. The estimate is based on a conservative sound level reduction for wall construction or sound curtains with an STC rating of 20 (NAIMA, 1997).

The above mitigation options will be included as a mitigation measure in the CEQA Initial Study being prepared for the Royal Gold project. As indicated in Table 4, each mitigation option is estimated to reduce noise levels from grinding activity to below the County's 60 dBA CNEL/Ldn noise standard. To verify the effectiveness of the chosen mitigation option(s), Royal Gold will be required to hire an acoustical expert to conduct a Noise Study. Based on the noise measurements taken during operation of the horizontal grinder and coir buster, it is estimated that the mitigation options will be effective in achieving compliance with the County's noise standard. However, if the chosen mitigation is determined to be ineffective in reducing the sound levels to below the County's 60 dBA CNEL/Ldn noise standard, additional mitigation and noise measurements will be required until the standard is achieved.

6. Air Quality

a. NCUAQMD and CARB Regulations

The Royal Gold operation is subject to the jurisdiction of the North Coast Unified Air Quality Management District (NCUAQMD) and the California Air Resources Board (CARB). Emissions of criteria air pollutants and toxic air contaminants are produced from the proposed project by stationary equipment and mobile equipment/vehicles. Stationary equipment includes a horizontal grinder and two soil mixing/bagging lines. Mobile equipment/vehicles include, but are not limited to, front-end loaders, fork-lifts, trommel screener, skid steer, mini-excavator, water trucks, street sweepers, and hauling trucks.

Royal Gold has a facility-wide Permit to Operate (No. NCU 472-12) from the NCUAQMD for the horizontal grinder and two soil/mixing bagging lines (NCAUQMD, 2020b). Royal Gold also has Permit to Operate (No. 001115-2) for the portable trommel screener (NCUAQMD, 2020a). These permits from the NCUAQMD contain specific operational conditions and emissions limitations to ensure the equipment does not exceed the air quality standards of the federal and state Clean Air Acts, California Health and Safety Code, and the Rules and Regulations of the NCUAQMD.

The off-road equipment fleet at the Royal Gold facility (front-end loaders, skid steer, mini-excavator, and one forklift) is subject to the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation (Off-Road Regulation). The Off-Road Regulation applies to all self-propelled off-road diesel vehicles 25 horsepower or greater used in California and most two-engine vehicles, and includes rented or leased vehicles. The goal of the state's Off-Road Regulation is to reduce particulate matter (PM) and oxides of nitrogen (NOx) emissions from in-use (such as, existing) off-road heavy-duty diesel vehicles. Most of the forklifts at the Royal Gold facility are subject to the CARB Large Spark Ignition (LSI) Engine Fleet Requirements Regulation. The LSI regulation requires operators of in-use fleets to achieve specific hydrocarbon (HC) + oxides of nitrogen (NOx) fleet average emission level standards. Royal Gold must submit information about its equipment/vehicles that are subject to these regulations through the DOORS system (ID: 161236), which is an online tool designed to help fleet owners report to CARB equipment inventories and actions taken to reduce emissions.

b. Fugitive Dust

Activities at the Royal Gold soil operation are required to meet NCUAQMD Rule 104 - Prohibitions, which bans nuisance dust generation and is enforceable by the NCUAQMD. Rule 104 states that "*reasonable precautions shall be taken to prevent particulate matter from becoming airborne*." To minimize impacts from fugitive dust generation, the NCUAQMD required Royal Gold to prepare and implement a Facility Dust Mitigation and Housekeeping Plan (Royal Gold, LLC, 2020a). To ensure the Plan is properly implemented, several members of the facility maintenance crew are tasked with addressing fugitive dust. Some of the minimization measures in the Plan include, but are not limited to, periodic watering of work areas and access roads, clean-up of soil material with street sweepers, covering material stockpiles with tarps, wetting of soil materials prior to processing, hanging geotextile nylon screens (60% shade, fabric weave shade cloth) on the open sides of pole-shed-style metal structures at the site, and suspending operational activities during high winds. The Plan is periodically updated to reflect current operational conditions.

c. Odors

Pursuant to 14 CCR § 17852 and § 17856, regulations of the California Department of Recycling and Recovery (CDRR), Royal Gold is defined as an Agricultural Material Composting Operation that is required to submit a notification to the Local Enforcement Agency (LEA) (which is the Humboldt County Division of Environmental Health). Royal Gold submitted the notification in 2014 to the LEA for the handling of commercially-produced compost and softwood sawdust as part of its soil production activities. Due to the potential for these materials to generate odors that could impact surrounding sensitive receptors (for example, residences), the LEA required Royal Gold to prepare an Odor Impact Minimization Plan (OIMP or Plan) (Royal Gold, LLC, 2020b). This OIMP has been prepared pursuant to the CDRR's requirements in 14 CCR § 17863.4. To ensure the Plan is properly implemented, Royal Gold has trained several members of its facility maintenance crew in the protocols for odor complaint response and odor reduction measures. Some of the minimization measures in the Plan include, but are not limited to, daily site assessment for potential odor impacts, monitoring of stockpile moisture and temperature, and

turning and hydrating stockpiles as needed. The Plan is periodically updated to reflect current operational conditions.

7. Stormwater Management

As part of past industrial use of the Royal Gold site, numerous stormwater drainage and management features were historically constructed (by others) that ultimately discharge to the Mad River. These features include drainage ditches, detention basins, drainage inlets, culverts, and stormwater piping. Currently, stormwater discharge from the western portion of the site flows to the southwest into roadside drainage ditches along Glendale Drive that discharge to the Mad River. Stormwater discharges from the central and eastern portions of the site flow to the south through a series of stormwater drainage ditches and culverts on adjacent private property, which discharge into Hall Creek and ultimately the Mad River.

The Royal Gold operation is subject to the authority of the SWRCB. Pursuant to the Statewide General Permit for Storm Water Discharges Associated with Industrial Activities, SWRCB Order 2014-0057-DWQ IGP, businesses in specified Standard Industrial Classification (SIC) codes must implement the IGP. Royal Gold's operations are in SIC Code 2875 (Fertilizers, Mixing Only). This includes mixed potting soil and fertilizers, which is the primary activity at this facility. Royal Gold obtained IGP coverage in August 2015 and was subsequently assigned Waste Discharger Identification Number (WDID) No. 1 12I025790. Royal Gold complies with the IGP with a SWPPP, which is periodically updated for current operational conditions. Royal Gold's approach to reducing pollutant concentrations in stormwater runoff leaving the site includes the following (SHN, 2021a):

- Personnel stormwater management training
- Site housekeeping and maintenance program
- Site cleanup of historical soil, metal, and trash (much of which was buried or overgrown)
- Installation of innovative best management practices (BMPs) to filter, slow, and reduce stormwater runoff
- Sampling and monitoring to evaluate the effectiveness of BMPs and identify areas for continual stormwater quality improvement

The company samples for stormwater characteristics and constituents including pH, total suspended solids (TSS), oil and grease (O&G), chemical oxygen demand (COD), nitrate + nitrite (nitrogen), total phosphorus, iron, aluminum, zinc, and lead. The primary stormwater pollutant constituents of concern and historically documented exceedances of the IGP Numeric Action Levels (NALs) at the Royal Gold site are iron, aluminum, nitrate + nitrite (nitrogen), TSS, and COD. It should be noted that the SIC code for Royal Gold does not require sampling for aluminum. Royal Gold has voluntarily sampled for aluminum, but may not be required to do so in the future once they are back to baseline for this constituent.

As discussed above in Chapter II.1 - Background, Humboldt Baykeeper filed a Clean Water Act lawsuit against Royal Gold in 2016, which resulted in a settlement agreement that expired in 2019. Per the settlement agreement, a number of stormwater improvements were constructed at the site, including installing additional paving. The company continues to construct stormwater improvements throughout the site for improved stormwater management facilities and practices

and to comply with the requirements of the IGP. Several of these improvements include upgrades to the stormwater infrastructure at the site that were installed by others during past industrial use. As discussed above, these improvements include the conversion of a central wetland area at the site into stormwater detention basins, with the offsetting wetland mitigation area. These stormwater management improvements have resulted in significant reductions in the pollutant concentrations detected in stormwater discharging from the facility and have improved stormwater quality leaving the site. The existing stormwater management features at the site are identified in the current SWPPP BMP Location Map (SHN, 2021a).

As discussed in Chapter II.4 – Proposed Improvements/Operational Changes, future stormwater improvements will include designing and constructing additional stormwater management areas on the central eastern portion of the site to transition former wetland areas into stormwater detention basins. These additional stormwater improvements are necessary to manage stormwater runoff from the new impervious surfaces proposed in the northern eastern portion of the site (for example, Building D and additional paving).

The stormwater improvements at the Royal Gold site are designed, installed, and maintained to treat stormwater discharges. It will be necessary for the stormwater improvements to adjoin future building and construction, and maintenance will occur within these features at seasonally-appropriate times to minimize impacts to sensitive animal species.

8. Lighting

Royal Gold will not operate at night, but security lighting at the site remains on 24 hours a day, 7 days per week. This lighting has successfully minimized trespassing on the property and is necessary for security cameras to pick up activity.

Lighting for operations at the site only occurs within the pole-shed-style metal structures on APNs 516-101-079 and 516-101-083 (see Figure 3 – Assessor's Parcel Numbers). The lighting is directed downward and shielded to reduce light spillover on adjoining properties to the maximum extent feasible.

The structure on APN 516-101-079 previously had ten high-pressure sodium lights hanging from the ceiling above the grinder/hydration area (see Figure 6 - Site Plan). These lights were two strips of five lights (but only one of the ten lights is on at night, to minimize light spilling onto the adjacent residential property to the south). The high-pressure sodium lights were recently replaced with LED lighting to conserve energy and reduce potential lighting impacts. Additional improvements to the structure that reduce lighting spillover include: 1) the eastern portion of the structure has been enclosed; and 2) several geotextile nylon screens (60% shade, fabric weave shade cloth) hang from the southern side of the structure. There are also two additional LED motion sensing lights mounted on the wall of the structure.

The structure on APN 516-101-083 has eighteen fluorescent lights on the ceiling above the main bagging line and the raw material bins (see Figure 6 – Site Plan). This structure also had six high-pressure sodium lights and has four new halogen lights (all of which are off when operations cease). The high-pressure sodium lights were recently replaced with LED lighting to conserve energy and reduce potential lighting impacts.

These measures effectively reduce lighting and glare onto adjacent properties. The current lighting at the facility is significantly less than the lighting when the lumber mill operated and is less than lighting currently at adjacent industrial and commercial properties.

As discussed in Chapter II.4 – Proposed Improvements/Operational Changes, the company proposes to install security/perimeter lighting adjacent to existing and proposed security boundary fencing. All new lighting fixtures will comply with the IDA requirements for reducing waste of ambient light ("dark sky compliant"). This includes, but is not limited to, requirements for acceptable fixture types and maximum color temperature. Compliance with IDA recommendations for the proposed security/perimeter lighting will significantly reduce lighting spillover on adjacent residential property and natural areas (for example, intermittent drainages and seasonal wetlands).

9. Hazardous Materials

a. Historic Contamination

As discussed in Chapter II.1 – Background, the project parcels were historically used for lumber mill operations (see Figure 4 – Blue Lake Forest Products Historic Aerial Photo (Unknown Date)). When the eastern portion of the site was a lumber mill, the resulting milled wood was treated with preservative solutions. Spillage and drippings of the wood-treating solutions caused pentachlorophenol (PCP) and tetrachlorophenol (TCP) contamination of the green chain area adjacent to the sawmill building. The former green chain area is on APNs 516-101-060 and 516-111-063 (see Figure 3 – Assessor's Parcel Numbers and Figure 6 – Site Plan). Because the lumber mill operations that caused the contamination became bankrupt, the State designated the area as a State Response hazardous materials site (Envirostor ID: 12240115), and the California Department of Toxic Substances Control (DTSC) took the responsibility for investigation and remediation of the site. On December 5, 1994, DTSC approved a Remedial Action Plan (RAP) for the site with several remedial actions:

- Consolidating PCP/TCP-contaminated soils under the former green chain area.
- Installing a reinforced concrete cap and metal structure over the former green chain area on portions of APNs 516-101-060 and 516-111-063.
- Recording a restrictive land use covenant (land use restrictions) controlling site activities that might compromise the integrity of the concrete cap and banning uses including residential, hospital, day-care, and school.
- Monitoring surface and groundwaters for effectiveness of the remedial actions.

DTSC certified the remedial actions at the site on March 9, 1998. On January 12, 1998, the State and the operating lumber mill company agreed to record a "*Covenant to Restrict Use of Property*" (1998-2896-38) with the land use restrictions on APNs 516-101-060 and 516-111-063.

As discussed in Chapter II.1 – Background, in 2002 the lumber mill company, Blue Lake Forest Products, Inc., declared bankruptcy and ceased lumber mill operations on the eastern portion of the site. When the lumber mill operations ceased, so did use of the mill's water production well (PW-1). Since 2002, the groundwater elevation appears to have risen approximately 15 feet.

The result is that groundwater is in contact with the PCP/TCP impacted soil beneath the concrete cap. The result has been some movement of the contaminants from the soils into the groundwater. Grab groundwater samples collected by DTSC in May 2005 at various locations reported PCP concentrations up to 16,000 micrograms per liter (µg/L) and TCP concentrations up to 1,500 µg/L, respectively. On April 22, 2008, DTSC issued an Imminent and Substantial Endangerment Determination (Docket No. I&SED 07/08-009) for the site, because there had been a release or threatened release of hazardous substances at the site. From December 2003 through May 2017, PCP and TCP have been detected in groundwater monitoring wells at decreased concentrations up to 2,200 µg/L PCP and 120 µg/L TCP (DTSC, 2018).

The former sawmill area located on APNs 516-111-062 and 516-111-063, is partially unpaved and located adjacent to the concrete cap at the former green chain area on APNs 516-101-060 and 516-111-063 (See Figure 3 – Assessor's Parcel Numbers; Figure 4 – Blue Lake Forest Products Historic Aerial Photo (Unknown Date); and Figure 6 – Site Plan). The former sawmill building was demolished in 2006. Portions of the building foundation remain at the former sawmill area and are in poor condition. In 2010 and 2011, DTSC conducted an investigation at the former sawmill area and found PCP concentrations in soil ranging from 1.8 milligrams per kilogram (mg/kg) to 40 mg/kg. DTSC established the PCP cleanup goal of 1.75 mg/kg in the 1994 Remedial Action Plan. (DTSC, 2018).

In 2018, DTSC decertified the 1998 remedial action certification. DTSC stated that the remedial actions in the 1994 RAP were no longer adequate because:

- Rising groundwater levels mobilized PCP/TCP in soil beneath the green chain area.
- Surface water can percolate through PCP/TCP-impacted soil present below the former sawmill infrastructure because it is partially unpaved and/or has a building foundation in poor condition.
- PCP/TCP could migrate offsite in groundwater or surface water runoff from the former sawmill area.

DTSC will have a RAP Amendment prepared to address the soil and groundwater contamination from past lumber mill uses. The RAP Amendment will evaluate a range of alternatives including, but not limited to, capping of the former sawmill area, enhanced biodegradation of chemicals in groundwater, long-term groundwater monitoring, surface water monitoring, and amending the land use covenant with Blue Lake Forest Products, Inc. (DTSC, 2018).

In December 2020, DTSC contracted with SHN Consulting Engineers and Geologists, Inc. to conduct additional investigation at the site and evaluate remediation options. The scope of work for the contract includes the following activities (DTSC, 2020):

- Conduct groundwater sampling for PCP, TCP, and dioxins at eight (8) groundwater monitoring wells and prepare a groundwater sampling report.
- Decommission and install a groundwater monitoring well.
- Evaluate remediation options and prepare a remediation evaluation letter report.
- Conduct one (1) round of surface water sampling for PCP, TCP, and dioxins at three (3) locations at the site: upgradient, downgradient, and adjacent to the area of contamination.

b. Royal Gold use of Restricted Area

Royal Gold leases APNs 516-101-060 and 516-111-063 from Blue Lake Forest Products, Inc., which have the original concrete cap and a metal structure, to store raw materials including commercially-produced compost. Such use is allowed by the land use covenant, as confirmed by DTSC (see Figure 6 – Site Plan). DTSC has indicated that when further remediation activities occur in the area within and around the concrete cap and the area of the former sawmill building, that Royal Gold will need to vacate this area.

c. Royal Gold Improvements Requiring Excavation

Some of the company's stormwater management improvements required the excavation of soils. The excavations were in areas outside of the land use covenant restricted area and outside of the area containing the former sawmill building. The excavated soils were stockpiled, covered with tarps, and sampled for various contaminants related to former lumber mill activity (for example, wood treating solutions, dioxins, petroleum hydrocarbons, etc.). On November 15, 2017, DTSC staff concluded that the test results for the soil samples from the stockpiles were below the regulatory screening levels for residential uses of such soils. The DTSC stated in a letter, "*Based on the results of the sampling, the stockpiled soils are below the levels DTSC uses for screening soil for unrestricted uses*." The DTSC also stated:

> "*In addition, DTSC is not aware of any residual contamination above unrestricted screening levels at the McNamara & Peepe site except within the capped area identified in the recorded land use covenant (1998-2896-38), a small area of contamination just east of the capped area between the former green chain and the former lumber mill, and in groundwater beneath these areas. Contamination in the uncapped area is not at the surface and is documented in the December 16, 2010 and the February 21, 2012 Technical Memorandums prepared by URS Corporation*."

Based on the sampling results and DTSC determination, the excavated soils were properly disposed of by reusing them in a manner consistent with the determination. This was done through the reuse of the soils as subbase for paved areas onsite.

As discussed in Chapter II.4 – Proposed Improvements/Operational Changes, there are several improvements proposed at the Royal Gold facility. These improvements have the potential to result in ground disturbance that could uncover unknown areas of contamination at the site. For this reason, a Soil and Groundwater Management Plan (SGMP) has been prepared and will be implemented for future ground-disturbing activities at the site (SHN, 2021c). The SGMP addresses recommendations for characterization of soil and groundwater impacted by potential site contaminants (PSCs) prior to proposed construction activities for worker safety, potential onsite reuse or offsite disposal, and management of excavated material at the property. The SGMP provides recommended guidance to protect site construction workers, the public, and the environment from PSCs in soil and/or groundwater encountered during site activities. The SGMP includes recommended actions to address handling, onsite reuse, and offsite disposal of contaminated soil and/or groundwater, if necessary. The objective of the SGMP is to ensure that no significant impacts occur to nearby sensitive receptors, aquatic species, and water resources.

d. Unified Program and California Environmental Reporting System (CERS)

CalEPA oversees California's "Unified Program." The program protects Californians from hazardous waste and hazardous materials by ensuring local regulatory agencies consistently apply statewide standards when they issue permits, conduct inspections, and engage in enforcement activities.

The CalEPA Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of six environmental and emergency response programs in California. These six programs (and their corresponding state oversight agencies) are:

- Hazardous Materials Release Response Plans and Inventories (Business Plans) - California Governor's Office of Emergency Services (Cal OES)
- California Accidental Release Prevention (CalARP) Program - California Governor's Office of Emergency Services (Cal OES)
- Underground Storage Tank (UST) Program - California State Water Resources Control Board (SWRCB)
- Aboveground Petroleum Storage Act (APSA) - Office of the State Fire Marshal (CAL FIRE-OSFM)
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs - Department of Toxic Substances Control (DTSC)
- California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements - Office of the State Fire Marshal (CAL FIRE-OSFM)

The Humboldt County Division of Environmental Health is the local Certified Unified Program Agency (CUPA) that implements the CalEPA's Unified Program.

In its business, Royal Gold stores and uses several hazardous materials, and thus is required to comply with the CalEPA Unified Program. The company files information about hazardous materials with the California Environmental Reporting System (CERS) (ID: 10330909 and Facility ID: 12-000-001492). CERS is the statewide web-based system that supports the electronic exchange of required Unified Program information among businesses, local governments, and the U.S. Environmental Protection Agency (EPA).

Such information from companies includes, but is not limited to, facility data regarding regulated hazardous material activities (for example, hazardous materials business plans, site maps, chemical inventories, etc.), underground and aboveground storage tanks, hazardous waste generation, and inspection, compliance, and enforcement actions. Royal Gold has prepared and filed an Emergency Response/Contingency Plan and Employee Training Plan, as well as a Hazardous Materials and Wastes Inventory Report on the CERS system. The hazardous materials at the company's operations include:

- Liquefied petroleum gas (LPG)
- Diesel fuel
- Gasoline

- Motor oil
- Waste oil
- Waste oily absorbent
- Acetylene
- Oxygen

10. Utilities and Services

a. Utilities

- Wastewater: Wastewater collection is provided to the project site by the Fieldbrook-Glendale Community Services District (FGCSD) who contracts with the City of Arcata for sanitary sewer treatment and disposal. The FGCSD designates the company as a Significant Industrial User and has issued the company a Wastewater Discharge Permit (2020-01) authorizing discharges of industrial wastewater. The Permit has discharge standards, flow limitations, and monitoring, sampling, and reporting requirements. The company fulfills the requirements, so its wastewater discharge does not adversely affect the City's wastewater treatment facility. Onsite pretreatment of wastewater involves the removal of sediment from the effluent through a vibratory separator.

  The company also has portable chemical toilets on site that are maintained and serviced by a sanitary service provider.

- Water: FGCSD also provides water services to the project site. The District buys water from the Humboldt Bay Municipal Water District (HBMWD), which is piped from its original source – subsurface wells on the Mad River upstream of the City of Arcata.

- Electricity & Gas: The site receives electricity and gas services from Pacific Gas & Electric (PG&E).

b. Services

- Fire protection: Fire protection services are provided by the Blue Lake Fire Protection District and/or the California Department of Forestry and Fire Protection.

- Law enforcement: Law enforcement services are provided by the Humboldt County Sheriff's Department.

- Solid Waste: Solid Waste Disposal is provided by Recology, which includes recycling services.

11. Transportation and Parking/Loading Plan

a. Transportation

- Access Roads: The existing access road entrance and exits to the facility are located off Glendale Drive (Co. Rd. No. 4L765) and are approximately 40-60 feet in width. The primary entrance/exit at the site is in the central southern portion of the facility through APN 516-101-008. There are also two additional exits in the southwestern and southeastern corners of the facility on APNs 516-101-079 and 516-111-062 (see Figure 3 - Assessor's Parcel Numbers and Figure 6 – Site Plan).

  Locked gates at the entrances/exits restrict access to the project site. The main entrance/exit on APN 516-101-008 has a gate approximately 350 feet in from Glendale Drive, the exit on APN 516-111-062 has a gate approximately 70 feet in from Glendale Drive, and the exit on APN 516-101-079 has a gate approximately 80 feet in from Glendale Drive. These entrances/exits are paved more than 50 feet in length and 24 feet in width, which meets the County's design standard for paved aprons.

  Materials are imported to the site and the soil and fertilizer products are exported from the site using these entrance/exits to access Glendale Drive and then Highway 299, which is less than 500 feet from the project site (see Figure 6 – Site Plan).

- Trip Generation: At full buildout of the Royal Gold facility, it is estimated that average truck traffic generated by the operation will be approximately 60 trips per day (30 in/30 out). During periods of peak use, maximum truck traffic could be 10 (5 in/5 out) truck trips per hour; however, there will be long periods with little or no project-generated traffic. These numbers take into consideration materials being imported to the site and materials being exported from the site. At full build out, employees will generate approximately 130 vehicle trips (65 in/65 out) per day. On average, full build out of the Royal Gold facility will generate a total of approximately 190 vehicle/truck trips (95 in/95 out) per day. Royal Gold distributes all of its product through distributors and contract haulers.

b. Off-Street Parking Spaces and Exception Petition

The Royal Gold soil operation consists of several land use types including office, warehouse, and manufacturing. The off-street parking requirements applicable to the operation are contained in Section 314-109.1 of the Humboldt County Zoning Regulations. The parking requirements for the land use types conducted by Royal Gold include the following:

Table 5: Off-Street Parking Requirements by Land Use Type

General Use Type	Specific Use Type	Parking Requirement
Commercial	Offices	One (1) parking space for every 300 square feet of gross floor area plus one (1) space for each employee.
Industrial	Warehouse	The higher of one parking space for each 1,500 square feet of gross floor area space within all enclosed building areas or one (1) parking space for each employee at the peak shift.
Industrial	Manufacturing	The higher of one (1) parking space for every four (4) employees or one (1) parking space for each 2,500 square feet of gross floor area.

The proposed square footage of the different uses at the Royal Gold facility at full build-out, the number of employees, and the required number of off-street parking spaces are shown in Table 6.

Table 6: Required Number of Off-Street Parking Spaces

Type of Use	Area (Square Foot)	Number of Employees	Number of Off-Street Parking Spaces	Basis of Calculation
Office	3,963	8	21	Square Footage & # of Employees
Warehouse	7,460	6	6	Square Footage
Manufacturing	174,480	51	70	Square Footage
TOTAL	**185,903**	--	**97**	--

Based on the County's off-street parking requirements, Royal Gold is required to provide 97 off-street parking spaces at its facility. The number of off-street parking spaces required by Section 314-109.1 of the zoning regulations significantly exceeds the number of such parking spaces needed at full build-out of the Royal Gold facility. For this reason, Royal Gold is requesting an exception to the number of parking spaces required pursuant to Section 109.1.2.12 of the Humboldt County Zoning Regulations. Royal Gold is requesting that the number of parking spaces be based on the number of employees, instead of square footage or square footage and the number of employees. As such, the justification for the exception petition is the level of anticipated use at the Royal Gold facility pursuant to Section 109.1.2.12.6 of the Humboldt County Zoning Regulations.

The number of employees at full build-out is estimated to be just over what it is now, approximately 65 employees. This is because even though Royal Gold's production level is anticipated to increase over time, the company will be automating its manufacturing processes, which is not expected to require an increase in the number of employees. There are currently 73 off-street parking spaces at the facility, which are expected to be sufficient parking for employees and visitors at full build-out. Therefore, the exception petition is requesting a reduction of 24 off-street parking spaces. Table 7 identifies the dimensions of the existing parking spaces at the facility:

Table 7: Parking Space Dimensions

Type of Space	Size of Space	# of Spaces
Standard	8’ W x 18’ L	70
ADA Accessible	18’ W x 18’ L	3
TOTAL	--	**73**

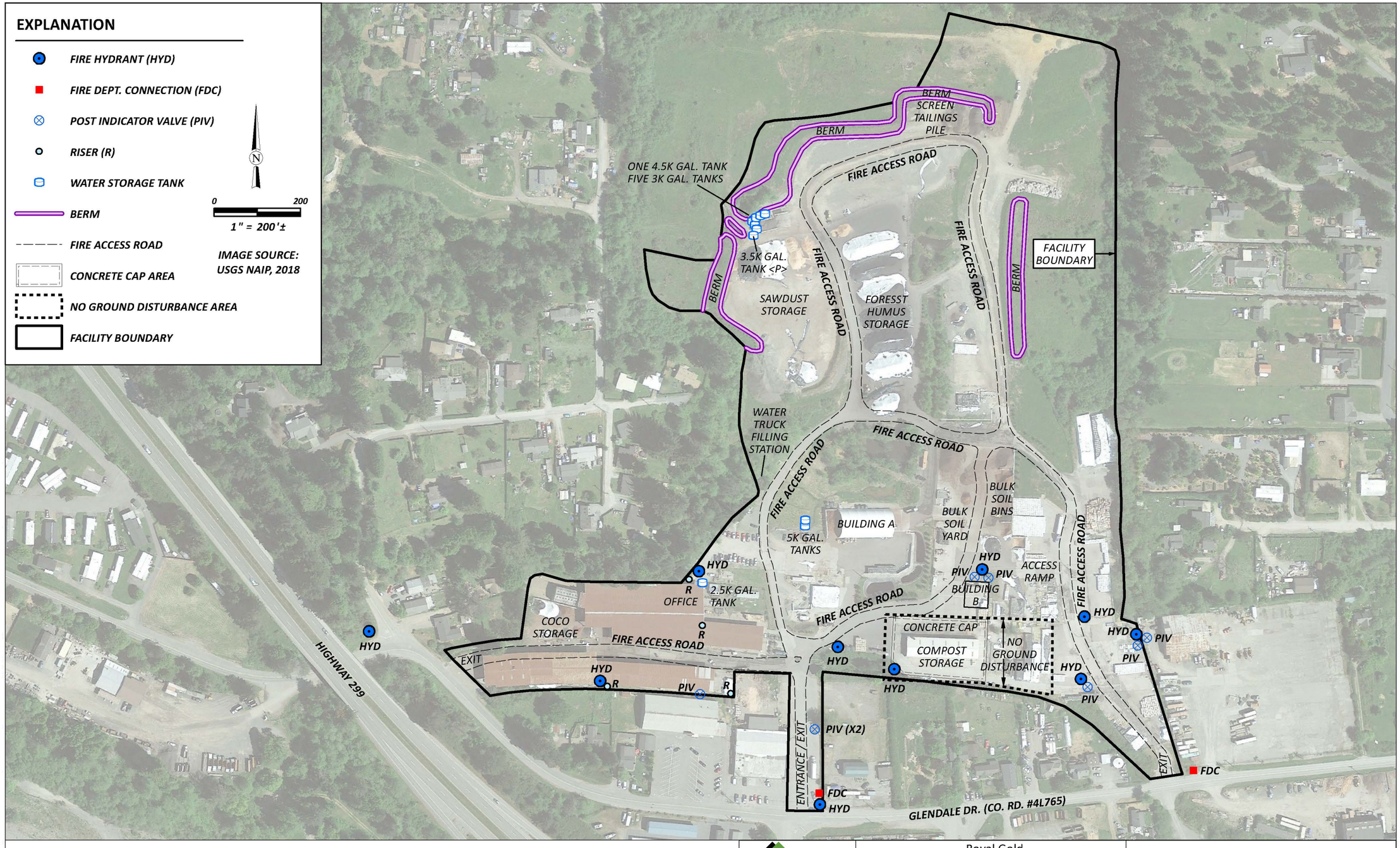
Figure 6 - Site Plan shows where the off-street parking spaces are located at the Royal Gold facility. As shown on Figure 6, Royal Gold currently has seventy (70) standard parking spaces in various locations at the site and three (3) accessible parking spaces directly adjacent to the office and maintenance shop. Per CBC Table 11B-208.2, three (3) ADA accessible parking spaces are required for facilities with 51-75 parking spaces.

Loading Spaces

The loading space requirements applicable to the Royal Gold facility are in Section 314-109.1.4 of the Humboldt County Zoning Regulations, which requires one (1) loading space for each 20,000 square feet of gross floor area, or portion thereof. Based on the proposed square footage of uses at the Royal Gold facility at full build-out (approximately 185,903 square feet), nine (9) loading spaces need to be provided. Figure 6 - Site Plan shows where the existing and proposed loading spaces are located at the site. As shown on Figure 6, Royal Gold would provide ten (10) loading spaces, consistent with the loading space requirements in the Humboldt County Zoning Regulations.

12. Fire Suppression Infrastructure and Emergency Access

The Royal Gold facility has a variety of existing fire suppression infrastructure elements that were historically installed by others when the site was used for lumber milling activity and other industrial uses. The company has maintained and improved some of this infrastructure to meet the needs of its business and comply with current fire code requirements. Royal Gold has also installed several water storage tanks, which are available for fire suppression purposes. Through the Conditional Use Permit process, the Blue Lake Fire Protection District has conducted site visits and advised Royal Gold on the following: 1) fire suppression infrastructure in need of inspection and repair; and 2) the required design for the facility access roads to meet fire code requirements for emergency access. Royal Gold has contracted with Frontier Fire Protection to inspect the fire suppression infrastructure at the site and conduct the needed repairs. Figure 7 - Fire Suppression and Access Map shows the existing infrastructure at the site as well as the designated fire access roads.



	Royal Gold Plan of Operations Glendale Dr. Humboldt County, California	Fire Suppression and Access Map SHN 016098	
	October 2021	SMPO_Fig7_FireSuppressionAndAccess	Figure 7

III. REFERENCES

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Facility Housekeeping and Dust Mitigation Plan

5.2

FACILITY DUST MITIGATION and HOUSEKEEPING PLAN

Permit to Operate

NCU 472-12

Updated December 2020

1. Company and Project Information

Company Name and Address		Project Location	
Name: Royal Gold, LLC		Location: Community of Glendale (Unincorporated)	
Address: 600 F Street, Suite 3, Box 603		Address: 1689 Glendale Drive	
City/State: Arcata, CA	Zip: 95521	City/State: McKinleyville, CA	Zip: 95519
Contact: Chad Waters, Owner		Bulk Material Sampling Performed: [ ] Yes [√] No Air Sampling Performed: [ ] Yes [√] No	
Phone: (707) 822-4653	Fax: (707) 825-8832		

2. Project Information

Royal Gold, LLC is a coco fiber and potting soil manufacturer & wholesaler located at 1689 Glendale Drive in the unincorporated community of Glendale in Humboldt County. The soil operation site is located on fourteen separate parcels on the north side of Glendale Drive (APN 516-101-08, -17, -40, -41, -60, -63, -64, -68, -79, -81, -83, -84 & 516-111-62, -63) that have been used for industrial purposes since the 1950s. The Facility Site Plan is attached to this Facility Dust and Housekeeping Plan, which shows the existing site layout and proposed site improvements.

3. Site/Facility Information

Areas and facilities within a quarter mile (400 meters) of the Site/Facility include:

- Residential
- Commercial
- Industrial

4. Track-out onto the paved public road

The following measures to minimize dust generation from track-out onto Glendale Drive shall be adhered to including:

a) Any visible track-out onto Glendale Drive shall be removed as needed using one of several street sweepers. A log of all street sweeper activity will be kept on-site.
b) To minimize dust and/or track-out of materials, the entrances/exits for the facility are paved from their intersections with Glendale Drive to the following distances into the site:
    - The main entrance/exit at the site on parcel 516-101-008 has pavement extending approximately 300 feet from the intersection with Glendale Drive.
    - The exit at the site on parcel 516-101-079 has pavement extending approximately 80 feet from the intersection with Glendale Drive.

- The exit at the site on parcel 516-111-062 has pavement extending approximately 70 feet from the intersection with Glendale Drive.

5. Active Storage Piles

a) Active material stockpiles are kept tarped except during the addition and removal of material to minimize dust generation whenever feasible.
b) Active material stockpiles for the bagging lines are kept in concrete bins, under the cover of pole shed buildings or are tarped daily.

6. Exposed Areas and Inactive Stockpiles

The following measures to minimize dust generation from exposed areas, inactive stockpiles, or soil materials shall be adhered to including:

a) Periodic watering of the access roads and work areas during activity at the site shall occur to reduce fugitive dust emissions. During project operations, two water trucks are used for watering the access roads and work areas as needed. Manual hose watering of work areas also occurs as needed during times of peak activity.
b) Inactive material stockpiles shall be adequately wetted, covered with tarps, and/or placed under covered structures to minimize dust generation.
c) When wind speeds exceed 15 m.ph. and result in dust emissions crossing the property line, activities shall be suspended until the area is adequately wetted.
d) Wood particles or other similar materials deposited on the roof of any buildings, on the ground, or elsewhere shall be removed or controlled as soon as practicable. A street sweeper is used to increase the efficiency of collecting the material.
e) Daily logs will be kept on-site documenting all dust mitigation activities including the application of water and sweeping of fugitive soil material.
f) Metal walls have been installed on the southern and eastern sides of the compost storage building on parcels 516-101-060 and 516-111-063 to limit wind exposure and minimize dust generation.
g) No stockpiles will be stored in the southeast portion of the facility, as delineated on the Facility Site Plan, to minimize dust from escaping off-site to the south and east.

7. Traffic on On-Site Unpaved Roads, Parking Lots, and Staging Areas

The following measures to minimize dust generation from traffic on on-site unpaved roads, parking lots, and staging areas shall be adhered to including:

a) Equipment and vehicles/trucks on site shall be required to maintain a maximum 10 m.p.h. speed limit. Speed limits are posted on-site in several locations.
b) Equipment and vehicle/truck traffic on site shall be restricted to roads, parking lots, and staging areas that are either:
    1) Adequately wetted (i.e. sufficiently mixed or penetrated with liquid to prevent the release of particulates);
    2) Maintained with a minimum 3" gravel coating of less than 5% silt content and 0.10% NOA content;
    3) Coated with a chemical dust suppressant such as lignin or magnesium chloride; or
    4) Paved.

8. Earth Moving Activities

The project does not typically involve earth moving activities including quarrying, excavation, or grading. When grading or excavation is proposed for the installation of storage buildings, utilities, stormwater improvements and maintenance, access road maintenance, landscaping, etc., the following measures shall be adhered to including:

a) Pre-wetting the ground to the depth of anticipated cuts during dry months.
b) Application of water prior to any land clearing.
c) Suspending grading operations during dry months when wind speeds are high enough to result in dust emissions crossing the property line.
d) All dust mitigation activities including the application of water and the suspension of grading activities will be documented and records will be kept on-site.

9. Off-Site Transport

The off-site transport of packaged and palletized soil material generates minimal dust. During the off-site transport of bulk soil material using open bodied trucks the following measures shall be adhered to including:

a) Loads shall maintain adequate moisture content before and during loading.
b) Loads shall be covered with tarps.

10. Material Handling/Processing

Processing equipment used at the Royal Gold facility includes a horizontal grinder, screener, bale buster, and soil mixing/bagging lines. To minimize dust generation during processing activities, the following measures are adhered to including:

Grinder (CMI Biogrind 175)

a) The grinder is operated under covered buildings to limit wind exposure.
b) All materials processed with the grinder are adequately wetted prior to processing.
c) The grinder is equipped with water spray bars.
d) To minimize dust from escaping from the grinder area, geotextile nylon screens are hung from the open edges of the structures where grinding occurs.

Screener (Terex Phoenix 2100)

a) The trommel screener will be located a minimum of 300 feet from the nearest residential property line to minimize dust from escaping off-site.
b) A fabricated shroud has been placed on the end of the screener to direct dust and materials downward.
c) The belt on the screener has been lowered so materials do not fall as far before reaching the finished stockpile.

Bale Buster (Kase Gobbler Model #3561)

a) The bale buster is operated in a covered, enclosed building on parcels 516-111-062, -063 (see Facility Site Plan).

Soil Mixing/Bagging Lines (Bouldin & Lawson mixing lines, Bouldin & Lawson and Premier Bagging lines)

a) The soil mixing/bagging lines are located in covered buildings to limit wind exposure and minimize dust generation.
b) The soil mixing/bagging lines are equipped with water spray bars.
c) Amendment hoppers are located in enclosed “dust huts” with air filters to reduce fugitive dust.

11. Frequency of Reporting

Royal Gold shall record the results of any air monitoring conducted at the request of the APCO.

CalEEMod Emissions Modeling

5.3

CalEEMod Emissions Modeling

5.3

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Royal Gold Soil Operation

Humboldt County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Manufacturing	174.50	1000sqft	4.01	174,500.00	0
Unrefrigerated Warehouse-No Rail	7.50	1000sqft	0.17	7,500.00	0
General Office Building	4.00	1000sqft	0.09	4,000.00	0
Other Asphalt Surfaces	7.00	Acre	7.00	304,920.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	103
Climate Zone	1			**Operational Year**	2023
Utility Company	Redwood Coast Energy Authority				
CO2 Intensity (lb/MWhr)	405.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Royal Gold has enrolled in the RCEA Repower+ program, which provides 100% renewable energy to their facility. As such, the GHG emissions intensity factors for the power provided to Royal Gold would be less than those noted above and the indirect GHG emissions from project electricity use would be less.

Land Use - Based on the s.f. of structures and paving proposed for full buildout of the Royal Gold facility. This includes the s.f. of existing buildings at the site constructed during past industrial use and the buildings constructed by Royal Gold (e.g., Buildings A and B). This results in an overestimation of construction emissions but is necessary to provide a more accurate estimate of operational emissions.

Construction Phase - The above default schedule assumes all improvements would be constructed from May 2022 to November 2023. Although phasing of the improvements may occur, the construction schedule is unknown at this time. The duration for the demolition phase was reduced to 5 days since the project does not require the demolition of any structures.

Off-road Equipment - It is estimated that 2 trenchers and 2 backhoes will be needed for the proposed utility trenching.

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Grading - Grading activity would be minimized since the site is relatively flat with existing graded and compacted surfaces from past industrial development. The site is proposed to be balanced. The total acres of grading includes the ~11-acres of existing/proposed buildings and proposed paving as well as the approximate 3.2-acre wetland mitigation area.

Demolition - No demolition of structures is required for development of the project site.

Architectural Coating - The majority of the proposed metal and cinder block structures will not require interior or exterior painting. Only the proposed new office building and bathrooms (Building F - 2,000 s.f.) would require painting.

Vehicle Trips - Trip rates adjusted per number of employees and estimated trips from Plan of Operations. General Office Building: 4,000 s.f. for 8 employees generating 16 trips per day equals 4 trips per 1,000 s.f. Manufacturing: 174,500 s.f. for 51 employees generating 102 trips per day + 60 truck trips per day (total 162 trips) equals 0.93 trips per 1,000 s.f. Unrefrigerated Warehouse-No Rail = 7,500 s.f. for 6 empoloyees generating 12 trips per day equals 1.6 trips per 1,000 s.f.

Area Coating - The majority of the proposed metal and cinder block structures will not require interior or exterior painting. Only the proposed new office building and bathrooms (Building F - 2,000 s.f.) would require painting.

Stationary Sources - Emergency Generators and Fire Pumps - The project intermittently uses generators in areas of the site where electrical service is not available. The project proposes to install electrical infrastructure in areas of the site where generators are currently used so the generators would primarily be used for emergency purposes.

Land Use Change - The northeastern portion of the site that is proposed to be paved currently contains grasses (native and non-native) growing on graded and compacted surfaces that were historically used as log decks.

Construction Off-road Equipment Mitigation - Watering of exposed areas would occur during construction activity per the requirements of the Facility Dust Mitigation and Housekeeping Plan.

Waste Mitigation - The facility receives recycling services, which is estimated to reduce solid waste by a minimum of 20 percent.

Table Name	Column Name	Default Value	New Value
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tblConstructionPhase	PhaseEndDate	5/27/2022	5/6/2022
tblGrading	AcresOfGrading	90.00	30.00
tblGrading	AcresOfGrading	15.00	7.00
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
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tblStationaryGeneratorsPumpsEF	CH4_EF	0.07	0.07
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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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tblVehicleTrips	SU_TR	5.09	0.93
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tblVehicleTrips	WD_TR	9.74	4.00
tblVehicleTrips	WD_TR	3.93	0.93
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2.0 Emissions Summary

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	4.8920	49.1337	40.2821	0.0784	19.0385	2.2982	20.6526	10.0718	2.1144	11.5568	0.0000	7,609.5305	7,609.5305	2.3637	0.3283	7,672.3605
2023	19.7488	19.5456	27.2779	0.0648	3.1207	0.7431	3.8638	0.8387	0.6994	1.5380	0.0000	6,477.7110	6,477.7110	0.7198	0.3115	6,587.8958
Maximum	**19.7488**	**49.1337**	**40.2821**	**0.0784**	**19.0385**	**2.2982**	**20.6526**	**10.0718**	**2.1144**	**11.5568**	**0.0000**	**7,609.5305**	**7,609.5305**	**2.3637**	**0.3283**	**7,672.3605**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	4.8920	49.1337	40.2821	0.0784	7.5653	2.2982	9.1794	3.9652	2.1144	5.4502	0.0000	7,609.5305	7,609.5305	2.3637	0.3283	7,672.3605
2023	19.7488	19.5456	27.2779	0.0648	3.1207	0.7431	3.8638	0.8387	0.6994	1.5380	0.0000	6,477.7110	6,477.7110	0.7198	0.3115	6,587.8958
Maximum	**19.7488**	**49.1337**	**40.2821**	**0.0784**	**7.5653**	**2.2982**	**9.1794**	**3.9652**	**2.1144**	**5.4502**	**0.0000**	**7,609.5305**	**7,609.5305**	**2.3637**	**0.3283**	**7,672.3605**

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**51.78**	**0.00**	**46.80**	**55.97**	**0.00**	**46.63**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	4.1959	1.8000e-004	0.0197	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0422	0.0422	1.1000e-004		0.0450
Energy	0.0202	0.1839	0.1545	1.1000e-003		0.0140	0.0140		0.0140	0.0140		220.6672	220.6672	4.2300e-003	4.0500e-003	221.9785
Mobile	0.9213	1.7629	8.6021	0.0155	1.5182	0.0193	1.5375	0.4055	0.0182	0.4237		1,590.3729	1,590.3729	0.1096	0.0915	1,620.3736
Stationary	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.1375**	**1.9470**	**8.7762**	**0.0166**	**1.5182**	**0.0334**	**1.5515**	**0.4055**	**0.0322**	**0.4378**		**1,811.0823**	**1,811.0823**	**0.1139**	**0.0955**	**1,842.3972**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	4.1959	1.8000e-004	0.0197	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0422	0.0422	1.1000e-004		0.0450
Energy	0.0202	0.1839	0.1545	1.1000e-003		0.0140	0.0140		0.0140	0.0140		220.6672	220.6672	4.2300e-003	4.0500e-003	221.9785
Mobile	0.9213	1.7629	8.6021	0.0155	1.5182	0.0193	1.5375	0.4055	0.0182	0.4237		1,590.3729	1,590.3729	0.1096	0.0915	1,620.3736
Stationary	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.1375**	**1.9470**	**8.7762**	**0.0166**	**1.5182**	**0.0334**	**1.5515**	**0.4055**	**0.0322**	**0.4378**		**1,811.0823**	**1,811.0823**	**0.1139**	**0.0955**	**1,842.3972**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/1/2022	5/6/2022	5	5	
2	Site Preparation	Site Preparation	5/28/2022	6/10/2022	5	10	
3	Grading	Grading	6/11/2022	7/22/2022	5	30	
4	Building Construction	Building Construction	7/23/2022	9/15/2023	5	300	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5	Paving	Paving	9/16/2023	10/13/2023	5	20	
6	Architectural Coating	Architectural Coating	10/14/2023	11/10/2023	5	20	
7	Trenching	Trenching	6/13/2022	7/1/2022	5	15	

Acres of Grading (Site Preparation Phase): 7

Acres of Grading (Grading Phase): 30

Acres of Paving: 7

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 10,000; Non-Residential Outdoor: 5,000; Striped Parking Area: 18,295 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Trenching	Trenchers	2	8.00	78	0.50
Trenching	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	206.00	80.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	41.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	4	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6392	25.7194	20.5941	0.0388		1.2427	1.2427		1.1553	1.1553		3,746.7812	3,746.7812	1.0524		3,773.0920
Total	**2.6392**	**25.7194**	**20.5941**	**0.0388**		**1.2427**	**1.2427**		**1.1553**	**1.1553**		**3,746.7812**	**3,746.7812**	**1.0524**		**3,773.0920**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1039	0.0797	0.7795	1.6800e-003	0.1916	1.2500e-003	0.1929	0.0508	1.1600e-003	0.0520		170.4581	170.4581	6.4300e-003	6.2700e-003	172.4879
Total	**0.1039**	**0.0797**	**0.7795**	**1.6800e-003**	**0.1916**	**1.2500e-003**	**0.1929**	**0.0508**	**1.1600e-003**	**0.0520**		**170.4581**	**170.4581**	**6.4300e-003**	**6.2700e-003**	**172.4879**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6392	25.7194	20.5941	0.0388		1.2427	1.2427		1.1553	1.1553	0.0000	3,746.7812	3,746.7812	1.0524		3,773.0920
Total	**2.6392**	**25.7194**	**20.5941**	**0.0388**		**1.2427**	**1.2427**		**1.1553**	**1.1553**	**0.0000**	**3,746.7812**	**3,746.7812**	**1.0524**		**3,773.0920**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1039	0.0797	0.7795	1.6800e-003	0.1916	1.2500e-003	0.1929	0.0508	1.1600e-003	0.0520		170.4581	170.4581	6.4300e-003	6.2700e-003	172.4879
Total	**0.1039**	**0.0797**	**0.7795**	**1.6800e-003**	**0.1916**	**1.2500e-003**	**0.1929**	**0.0508**	**1.1600e-003**	**0.0520**		**170.4581**	**170.4581**	**6.4300e-003**	**6.2700e-003**	**172.4879**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.8086	0.0000	18.8086	10.0108	0.0000	10.0108			0.0000			0.0000
Off-Road	3.1701	33.0835	19.6978	0.0380		1.6126	1.6126		1.4836	1.4836		3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**3.1701**	**33.0835**	**19.6978**	**0.0380**	**18.8086**	**1.6126**	**20.4212**	**10.0108**	**1.4836**	**11.4944**		**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1247	0.0956	0.9354	2.0100e-003	0.2299	1.5100e-003	0.2314	0.0610	1.3900e-003	0.0624		204.5497	204.5497	7.7200e-003	7.5300e-003	206.9855
Total	**0.1247**	**0.0956**	**0.9354**	**2.0100e-003**	**0.2299**	**1.5100e-003**	**0.2314**	**0.0610**	**1.3900e-003**	**0.0624**		**204.5497**	**204.5497**	**7.7200e-003**	**7.5300e-003**	**206.9855**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.3354	0.0000	7.3354	3.9042	0.0000	3.9042			0.0000			0.0000
Off-Road	3.1701	33.0835	19.6978	0.0380		1.6126	1.6126		1.4836	1.4836	0.0000	3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**3.1701**	**33.0835**	**19.6978**	**0.0380**	**7.3354**	**1.6126**	**8.9479**	**3.9042**	**1.4836**	**5.3878**	**0.0000**	**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1247	0.0956	0.9354	2.0100e-003	0.2299	1.5100e-003	0.2314	0.0610	1.3900e-003	0.0624		204.5497	204.5497	7.7200e-003	7.5300e-003	206.9855
Total	**0.1247**	**0.0956**	**0.9354**	**2.0100e-003**	**0.2299**	**1.5100e-003**	**0.2314**	**0.0610**	**1.3900e-003**	**0.0624**		**204.5497**	**204.5497**	**7.7200e-003**	**7.5300e-003**	**206.9855**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0826	0.0000	7.0826	3.4247	0.0000	3.4247			0.0000			0.0000
Off-Road	3.6248	38.8435	29.0415	0.0621		1.6349	1.6349		1.5041	1.5041		6,011.4105	6,011.4105	1.9442		6,060.0158
Total	**3.6248**	**38.8435**	**29.0415**	**0.0621**	**7.0826**	**1.6349**	**8.7175**	**3.4247**	**1.5041**	**4.9288**		**6,011.4105**	**6,011.4105**	**1.9442**		**6,060.0158**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1385	0.1063	1.0393	2.2300e-003	0.2555	1.6700e-003	0.2571	0.0678	1.5400e-003	0.0693		227.2775	227.2775	8.5800e-003	8.3600e-003	229.9839
Total	**0.1385**	**0.1063**	**1.0393**	**2.2300e-003**	**0.2555**	**1.6700e-003**	**0.2571**	**0.0678**	**1.5400e-003**	**0.0693**		**227.2775**	**227.2775**	**8.5800e-003**	**8.3600e-003**	**229.9839**

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7622	0.0000	2.7622	1.3357	0.0000	1.3357			0.0000			0.0000
Off-Road	3.6248	38.8435	29.0415	0.0621		1.6349	1.6349		1.5041	1.5041	0.0000	6,011.4105	6,011.4105	1.9442		6,060.0158
Total	**3.6248**	**38.8435**	**29.0415**	**0.0621**	**2.7622**	**1.6349**	**4.3971**	**1.3357**	**1.5041**	**2.8398**	**0.0000**	**6,011.4105**	**6,011.4105**	**1.9442**		**6,060.0158**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1385	0.1063	1.0393	2.2300e-003	0.2555	1.6700e-003	0.2571	0.0678	1.5400e-003	0.0693		227.2775	227.2775	8.5800e-003	8.3600e-003	229.9839
Total	**0.1385**	**0.1063**	**1.0393**	**2.2300e-003**	**0.2555**	**1.6700e-003**	**0.2571**	**0.0678**	**1.5400e-003**	**0.0693**		**227.2775**	**227.2775**	**8.5800e-003**	**8.3600e-003**	**229.9839**

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2166	4.9488	1.4602	0.0160	0.4894	0.0483	0.5376	0.1409	0.0462	0.1870		1,689.2169	1,689.2169	0.0106	0.2421	1,761.6378
Worker	1.4267	1.0946	10.7047	0.0230	2.6313	0.0172	2.6485	0.6978	0.0159	0.7137		2,340.9579	2,340.9579	0.0884	0.0861	2,368.8337
Total	**1.6433**	**6.0434**	**12.1649**	**0.0391**	**3.1206**	**0.0655**	**3.1861**	**0.8386**	**0.0621**	**0.9007**		**4,030.1748**	**4,030.1748**	**0.0990**	**0.3283**	**4,130.4715**

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2166	4.9488	1.4602	0.0160	0.4894	0.0483	0.5376	0.1409	0.0462	0.1870		1,689.2169	1,689.2169	0.0106	0.2421	1,761.6378
Worker	1.4267	1.0946	10.7047	0.0230	2.6313	0.0172	2.6485	0.6978	0.0159	0.7137		2,340.9579	2,340.9579	0.0884	0.0861	2,368.8337
Total	**1.6433**	**6.0434**	**12.1649**	**0.0391**	**3.1206**	**0.0655**	**3.1861**	**0.8386**	**0.0621**	**0.9007**		**4,030.1748**	**4,030.1748**	**0.0990**	**0.3283**	**4,130.4715**

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1529	4.1928	1.3132	0.0155	0.4894	0.0274	0.5168	0.1409	0.0262	0.1670		1,636.7554	1,636.7554	7.5900e-003	0.2327	1,706.2979
Worker	1.3408	0.9679	9.7207	0.0223	2.6313	0.0161	2.6473	0.6978	0.0148	0.7126		2,285.7457	2,285.7457	0.0794	0.0787	2,311.1919
Total	**1.4937**	**5.1607**	**11.0339**	**0.0379**	**3.1207**	**0.0434**	**3.1641**	**0.8387**	**0.0410**	**0.8796**		**3,922.5011**	**3,922.5011**	**0.0870**	**0.3115**	**4,017.4897**

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1529	4.1928	1.3132	0.0155	0.4894	0.0274	0.5168	0.1409	0.0262	0.1670		1,636.7554	1,636.7554	7.5900e-003	0.2327	1,706.2979
Worker	1.3408	0.9679	9.7207	0.0223	2.6313	0.0161	2.6473	0.6978	0.0148	0.7126		2,285.7457	2,285.7457	0.0794	0.0787	2,311.1919
Total	**1.4937**	**5.1607**	**11.0339**	**0.0379**	**3.1207**	**0.0434**	**3.1641**	**0.8387**	**0.0410**	**0.8796**		**3,922.5011**	**3,922.5011**	**0.0870**	**0.3115**	**4,017.4897**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.9170					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9497**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0976	0.0705	0.7078	1.6300e-003	0.1916	1.1700e-003	0.1928	0.0508	1.0800e-003	0.0519		166.4378	166.4378	5.7800e-003	5.7300e-003	168.2907
Total	**0.0976**	**0.0705**	**0.7078**	**1.6300e-003**	**0.1916**	**1.1700e-003**	**0.1928**	**0.0508**	**1.0800e-003**	**0.0519**		**166.4378**	**166.4378**	**5.7800e-003**	**5.7300e-003**	**168.2907**

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.9170					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9497**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0976	0.0705	0.7078	1.6300e-003	0.1916	1.1700e-003	0.1928	0.0508	1.0800e-003	0.0519		166.4378	166.4378	5.7800e-003	5.7300e-003	168.2907
Total	**0.0976**	**0.0705**	**0.7078**	**1.6300e-003**	**0.1916**	**1.1700e-003**	**0.1928**	**0.0508**	**1.0800e-003**	**0.0519**		**166.4378**	**166.4378**	**5.7800e-003**	**5.7300e-003**	**168.2907**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	19.2903					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**19.4820**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.2669	0.1926	1.9347	4.4400e-003	0.5237	3.1900e-003	0.5269	0.1389	2.9500e-003	0.1418		454.9300	454.9300	0.0158	0.0157	459.9945
Total	**0.2669**	**0.1926**	**1.9347**	**4.4400e-003**	**0.5237**	**3.1900e-003**	**0.5269**	**0.1389**	**2.9500e-003**	**0.1418**		**454.9300**	**454.9300**	**0.0158**	**0.0157**	**459.9945**

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	19.2903					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**19.4820**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.2669	0.1926	1.9347	4.4400e-003	0.5237	3.1900e-003	0.5269	0.1389	2.9500e-003	0.1418		454.9300	454.9300	0.0158	0.0157	459.9945
Total	**0.2669**	**0.1926**	**1.9347**	**4.4400e-003**	**0.5237**	**3.1900e-003**	**0.5269**	**0.1389**	**2.9500e-003**	**0.1418**		**454.9300**	**454.9300**	**0.0158**	**0.0157**	**459.9945**

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.8 Trenching - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0594	10.1308	9.6817	0.0130		0.6608	0.6608		0.6080	0.6080		1,257.2038	1,257.2038	0.4066		1,267.3689
Total	**1.0594**	**10.1308**	**9.6817**	**0.0130**		**0.6608**	**0.6608**		**0.6080**	**0.6080**		**1,257.2038**	**1,257.2038**	**0.4066**		**1,267.3689**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0693	0.0531	0.5196	1.1200e-003	0.1277	8.4000e-004	0.1286	0.0339	7.7000e-004	0.0346		113.6387	113.6387	4.2900e-003	4.1800e-003	114.9919
Total	**0.0693**	**0.0531**	**0.5196**	**1.1200e-003**	**0.1277**	**8.4000e-004**	**0.1286**	**0.0339**	**7.7000e-004**	**0.0346**		**113.6387**	**113.6387**	**4.2900e-003**	**4.1800e-003**	**114.9919**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.8 Trenching - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0594	10.1308	9.6817	0.0130		0.6608	0.6608		0.6080	0.6080	0.0000	1,257.2038	1,257.2038	0.4066		1,267.3689
Total	**1.0594**	**10.1308**	**9.6817**	**0.0130**		**0.6608**	**0.6608**		**0.6080**	**0.6080**	**0.0000**	**1,257.2038**	**1,257.2038**	**0.4066**		**1,267.3689**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0693	0.0531	0.5196	1.1200e-003	0.1277	8.4000e-004	0.1286	0.0339	7.7000e-004	0.0346		113.6387	113.6387	4.2900e-003	4.1800e-003	114.9919
Total	**0.0693**	**0.0531**	**0.5196**	**1.1200e-003**	**0.1277**	**8.4000e-004**	**0.1286**	**0.0339**	**7.7000e-004**	**0.0346**		**113.6387**	**113.6387**	**4.2900e-003**	**4.1800e-003**	**114.9919**

4.0 Operational Detail - Mobile

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.9213	1.7629	8.6021	0.0155	1.5182	0.0193	1.5375	0.4055	0.0182	0.4237		1,590.3729	1,590.3729	0.1096	0.0915	1,620.3736
Unmitigated	0.9213	1.7629	8.6021	0.0155	1.5182	0.0193	1.5375	0.4055	0.0182	0.4237		1,590.3729	1,590.3729	0.1096	0.0915	1,620.3736

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	16.00	16.00	16.00	44,173	44,173
Manufacturing	162.29	162.29	162.29	626,983	626,983
Other Asphalt Surfaces	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	12.00	12.00	12.00	46,362	46,362
Total	190.29	190.29	190.29	717,517	717,517

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	14.70	6.60	6.60	33.00	48.00	19.00	77	19	4
Manufacturing	14.70	6.60	6.60	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	14.70	6.60	6.60	59.00	0.00	41.00	92	5	3

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.443629	0.069650	0.207187	0.154075	0.057336	0.011288	0.006778	0.008856	0.000975	0.000221	0.034425	0.001490	0.004089
Manufacturing	0.443629	0.069650	0.207187	0.154075	0.057336	0.011288	0.006778	0.008856	0.000975	0.000221	0.034425	0.001490	0.004089
Other Asphalt Surfaces	0.443629	0.069650	0.207187	0.154075	0.057336	0.011288	0.006778	0.008856	0.000975	0.000221	0.034425	0.001490	0.004089
Unrefrigerated Warehouse-No Rail	0.443629	0.069650	0.207187	0.154075	0.057336	0.011288	0.006778	0.008856	0.000975	0.000221	0.034425	0.001490	0.004089

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0202	0.1839	0.1545	1.1000e-003		0.0140	0.0140		0.0140	0.0140		220.6672	220.6672	4.2300e-003	4.0500e-003	221.9785
NaturalGas Unmitigated	0.0202	0.1839	0.1545	1.1000e-003		0.0140	0.0140		0.0140	0.0140		220.6672	220.6672	4.2300e-003	4.0500e-003	221.9785

Royal Gold Soil Operation - Humboldt County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	211.945	2.2900e-003	0.0208	0.0175	1.2000e-004		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003		24.9347	24.9347	4.8000e-004	4.6000e-004	25.0829
Manufacturing	1663.73	0.0179	0.1631	0.1370	9.8000e-004		0.0124	0.0124		0.0124	0.0124		195.7325	195.7325	3.7500e-003	3.5900e-003	196.8956
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0202**	**0.1839**	**0.1545**	**1.1000e-003**		**0.0140**	**0.0140**		**0.0140**	**0.0140**		**220.6672**	**220.6672**	**4.2300e-003**	**4.0500e-003**	**221.9785**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	0.211945	2.2900e-003	0.0208	0.0175	1.2000e-004		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003		24.9347	24.9347	4.8000e-004	4.6000e-004	25.0829
Manufacturing	1.66373	0.0179	0.1631	0.1370	9.8000e-004		0.0124	0.0124		0.0124	0.0124		195.7325	195.7325	3.7500e-003	3.5900e-003	196.8956
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0202**	**0.1839**	**0.1545**	**1.1000e-003**		**0.0140**	**0.0140**		**0.0140**	**0.0140**		**220.6672**	**220.6672**	**4.2300e-003**	**4.0500e-003**	**221.9785**

6.0 Area Detail

6.1 Mitigation Measures Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	4.1959	1.8000e-004	0.0197	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0422	0.0422	1.1000e-004		0.0450
Unmitigated	4.1959	1.8000e-004	0.0197	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0422	0.0422	1.1000e-004		0.0450

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1057					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.0884					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.8200e-003	1.8000e-004	0.0197	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0422	0.0422	1.1000e-004		0.0450
Total	**4.1959**	**1.8000e-004**	**0.0197**	**0.0000**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**		**0.0422**	**0.0422**	**1.1000e-004**		**0.0450**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1057					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.0884					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.8200e-003	1.8000e-004	0.0197	0.0000		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005		0.0422	0.0422	1.1000e-004		0.0450
Total	**4.1959**	**1.8000e-004**	**0.0197**	**0.0000**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**		**0.0422**	**0.0422**	**1.1000e-004**		**0.0450**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
Emergency Generator	1	0	100	42	0.73	Diesel
Emergency Generator	1	0	100	31.5	0.73	Diesel
Emergency Generator	1	0	100	9.4	0.73	Diesel
Emergency Generator	1	0	100	4	0.73	Diesel
Emergency Generator	1	0	100	2.7	0.73	Diesel

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

10.1 Stationary Sources

Unmitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Emergency Generator - Diesel (0 - 11 HP)	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Emergency Generator - Diesel (25 - 50 HP)	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

11.0 Vegetation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Royal Gold Soil Operation

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1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Manufacturing	174.50	1000sqft	4.01	174,500.00	0
Unrefrigerated Warehouse-No Rail	7.50	1000sqft	0.17	7,500.00	0
General Office Building	4.00	1000sqft	0.09	4,000.00	0
Other Asphalt Surfaces	7.00	Acre	7.00	304,920.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	103
Climate Zone	1			**Operational Year**	2023
Utility Company	Redwood Coast Energy Authority				
CO2 Intensity (lb/MWhr)	405.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Royal Gold has enrolled in the RCEA Repower+ program, which provides 100% renewable energy to their facility. As such, the GHG emissions intensity factors for the power provided to Royal Gold would be less than those noted above and the indirect GHG emissions from project electricity use would be less.

Land Use - Based on the s.f. of structures and paving proposed for full buildout of the Royal Gold facility. This includes the s.f. of existing buildings at the site constructed during past industrial use and the buildings constructed by Royal Gold (e.g., Buildings A and B). This results in an overestimation of construction emissions but is necessary to provide a more accurate estimate of operational emissions.

Construction Phase - The above default schedule assumes all improvements would be constructed from May 2022 to November 2023. Although phasing of the improvements may occur, the construction schedule is unknown at this time. The duration for the demolition phase was reduced to 5 days since the project does not require the demolition of any structures.

Off-road Equipment - It is estimated that 2 trenchers and 2 backhoes will be needed for the proposed utility trenching.

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Grading - Grading activity would be minimized since the site is relatively flat with existing graded and compacted surfaces from past industrial development. The site is proposed to be balanced. The total acres of grading includes the ~11-acres of existing/proposed buildings and proposed paving as well as the approximate 3.2-acre wetland mitigation area.

Demolition - No demolition of structures is required for development of the project site.

Architectural Coating - The majority of the proposed metal and cinder block structures will not require interior or exterior painting. Only the proposed new office building and bathrooms (Building F - 2,000 s.f.) would require painting.

Vehicle Trips - Trip rates adjusted per number of employees and estimated trips from Plan of Operations. General Office Building: 4,000 s.f. for 8 employees generating 16 trips per day equals 4 trips per 1,000 s.f. Manufacturing: 174,500 s.f. for 51 employees generating 102 trips per day + 60 truck trips per day (total 162 trips) equals 0.93 trips per 1,000 s.f. Unrefrigerated Warehouse-No Rail = 7,500 s.f. for 6 empoloyees generating 12 trips per day equals 1.6 trips per 1,000 s.f.

Area Coating - The majority of the proposed metal and cinder block structures will not require interior or exterior painting. Only the proposed new office building and bathrooms (Building F - 2,000 s.f.) would require painting.

Stationary Sources - Emergency Generators and Fire Pumps - The project intermittently uses generators in areas of the site where electrical service is not available. The project proposes to install electrical infrastructure in areas of the site where generators are currently used so the generators would primarily be used for emergency purposes.

Land Use Change - The northeastern portion of the site that is proposed to be paved currently contains grasses (native and non-native) growing on graded and compacted surfaces that were historically used as log decks.

Construction Off-road Equipment Mitigation - Watering of exposed areas would occur during construction activity per the requirements of the Facility Dust Mitigation and Housekeeping Plan.

Waste Mitigation - The facility receives recycling services, which is estimated to reduce solid waste by a minimum of 20 percent.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	93,000.00	5,000.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	279,000.00	10,000.00
tblAreaCoating	Area_Nonresidential_Exterior	93000	5000
tblAreaCoating	Area_Nonresidential_Interior	279000	10000
tblConstructionPhase	NumDays	20.00	5.00
tblConstructionPhase	PhaseEndDate	5/27/2022	5/6/2022
tblGrading	AcresOfGrading	90.00	30.00
tblGrading	AcresOfGrading	15.00	7.00
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Trenchers
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblStationaryGeneratorsPumpsEF	CH4_EF	0.07	0.07
tblStationaryGeneratorsPumpsEF	CH4_EF	0.07	0.07
tblStationaryGeneratorsPumpsEF	CH4_EF	0.07	0.07
tblStationaryGeneratorsPumpsEF	CH4_EF	0.07	0.07
tblStationaryGeneratorsPumpsEF	CH4_EF	0.07	0.07
tblStationaryGeneratorsPumpsEF	CO_EF	4.10	4.10
tblStationaryGeneratorsPumpsEF	CO_EF	4.10	4.10
tblStationaryGeneratorsPumpsEF	CO_EF	5.97	5.97
tblStationaryGeneratorsPumpsEF	CO_EF	5.97	5.97
tblStationaryGeneratorsPumpsEF	CO_EF	5.97	5.97
tblStationaryGeneratorsPumpsEF	NOX_EF	5.32	5.32
tblStationaryGeneratorsPumpsEF	NOX_EF	5.32	5.32
tblStationaryGeneratorsPumpsEF	NOX_EF	5.32	5.32
tblStationaryGeneratorsPumpsEF	NOX_EF	5.32	5.32
tblStationaryGeneratorsPumpsEF	NOX_EF	5.32	5.32
tblStationaryGeneratorsPumpsEF	PM10_EF	0.45	0.45
tblStationaryGeneratorsPumpsEF	PM10_EF	0.45	0.45
tblStationaryGeneratorsPumpsEF	PM10_EF	0.60	0.60
tblStationaryGeneratorsPumpsEF	PM10_EF	0.60	0.60
tblStationaryGeneratorsPumpsEF	PM10_EF	0.60	0.60
tblStationaryGeneratorsPumpsEF	PM2_5_EF	0.45	0.45
tblStationaryGeneratorsPumpsEF	PM2_5_EF	0.45	0.45
tblStationaryGeneratorsPumpsEF	PM2_5_EF	0.60	0.60
tblStationaryGeneratorsPumpsEF	PM2_5_EF	0.60	0.60
tblStationaryGeneratorsPumpsEF	PM2_5_EF	0.60	0.60
tblStationaryGeneratorsPumpsEF	ROG_EF	2.2480e-003	2.2477e-003
tblStationaryGeneratorsPumpsEF	ROG_EF	2.2480e-003	2.2477e-003
tblStationaryGeneratorsPumpsEF	ROG_EF	2.2480e-003	2.2477e-003

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblStationaryGeneratorsPumpsEF	ROG_EF	2.2480e-003	2.2477e-003
tblStationaryGeneratorsPumpsEF	ROG_EF	2.2480e-003	2.2477e-003
tblStationaryGeneratorsPumpsUse	HorsePowerValue	0.00	42.00
tblStationaryGeneratorsPumpsUse	HorsePowerValue	0.00	31.50
tblStationaryGeneratorsPumpsUse	HorsePowerValue	0.00	9.40
tblStationaryGeneratorsPumpsUse	HorsePowerValue	0.00	4.00
tblStationaryGeneratorsPumpsUse	HorsePowerValue	0.00	2.70
tblStationaryGeneratorsPumpsUse	HoursPerYear	0.00	100.00
tblStationaryGeneratorsPumpsUse	HoursPerYear	0.00	100.00
tblStationaryGeneratorsPumpsUse	HoursPerYear	0.00	100.00
tblStationaryGeneratorsPumpsUse	HoursPerYear	0.00	100.00
tblStationaryGeneratorsPumpsUse	HoursPerYear	0.00	100.00
tblStationaryGeneratorsPumpsUse	NumberOfEquipment	0.00	1.00
tblStationaryGeneratorsPumpsUse	NumberOfEquipment	0.00	1.00
tblStationaryGeneratorsPumpsUse	NumberOfEquipment	0.00	1.00
tblStationaryGeneratorsPumpsUse	NumberOfEquipment	0.00	1.00
tblStationaryGeneratorsPumpsUse	NumberOfEquipment	0.00	1.00
tblVehicleTrips	ST_TR	2.21	4.00
tblVehicleTrips	ST_TR	6.42	0.93
tblVehicleTrips	ST_TR	1.74	1.60
tblVehicleTrips	SU_TR	0.70	4.00
tblVehicleTrips	SU_TR	5.09	0.93
tblVehicleTrips	SU_TR	1.74	1.60
tblVehicleTrips	WD_TR	9.74	4.00
tblVehicleTrips	WD_TR	3.93	0.93
tblVehicleTrips	WD_TR	1.74	1.60

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.2877	2.1455	2.3410	5.1700e-003	0.3751	0.0910	0.4660	0.1486	0.0848	0.2334	0.0000	464.3381	464.3381	0.0745	0.0176	471.4388
2023	0.5120	1.9388	2.7376	6.3200e-003	0.2782	0.0746	0.3528	0.0751	0.0701	0.1453	0.0000	572.0252	572.0252	0.0654	0.0267	581.6240
Maximum	**0.5120**	**2.1455**	**2.7376**	**6.3200e-003**	**0.3751**	**0.0910**	**0.4660**	**0.1486**	**0.0848**	**0.2334**	**0.0000**	**572.0252**	**572.0252**	**0.0745**	**0.0267**	**581.6240**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.2877	2.1455	2.3410	5.1700e-003	0.2529	0.0910	0.3439	0.0868	0.0848	0.1716	0.0000	464.3378	464.3378	0.0745	0.0176	471.4385
2023	0.5120	1.9388	2.7376	6.3200e-003	0.2782	0.0746	0.3528	0.0751	0.0701	0.1453	0.0000	572.0249	572.0249	0.0654	0.0267	581.6237
Maximum	**0.5120**	**2.1455**	**2.7376**	**6.3200e-003**	**0.2782**	**0.0910**	**0.3528**	**0.0868**	**0.0848**	**0.1716**	**0.0000**	**572.0249**	**572.0249**	**0.0745**	**0.0267**	**581.6237**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**18.70**	**0.00**	**14.92**	**27.65**	**0.00**	**16.34**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**5-1-2022**	**7-31-2022**	1.0414	1.0414
2	**8-1-2022**	**10-31-2022**	0.8296	0.8296
3	**11-1-2022**	**1-31-2023**	0.8180	0.8180
4	**2-1-2023**	**4-30-2023**	0.7326	0.7326
5	**5-1-2023**	**7-31-2023**	0.7430	0.7430
6	**8-1-2023**	**9-30-2023**	0.4374	0.4374
		Highest	1.0414	1.0414

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7656	2.0000e-005	1.7700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4500e-003	3.4500e-003	1.0000e-005	0.0000	3.6700e-003
Energy	3.6900e-003	0.0336	0.0282	2.0000e-004		2.5500e-003	2.5500e-003		2.5500e-003	2.5500e-003	0.0000	180.0066	180.0066	0.0124	2.0800e-003	180.9365
Mobile	0.1691	0.3320	1.6398	2.8200e-003	0.2596	3.5100e-003	0.2631	0.0697	3.3100e-003	0.0730	0.0000	262.5011	262.5011	0.0188	0.0155	267.6019
Stationary	7.2200e-003	0.0377	0.0313	3.0000e-005		3.3500e-003	3.3500e-003		3.3500e-003	3.3500e-003	0.0000	3.3510	3.3510	4.7000e-004	0.0000	3.3628
Waste						0.0000	0.0000		0.0000	0.0000	46.1094	0.0000	46.1094	2.7250	0.0000	114.2341
Water						0.0000	0.0000		0.0000	0.0000	13.5780	42.9266	56.5046	1.3981	0.0334	101.3954
Total	**0.9456**	**0.4032**	**1.7011**	**3.0500e-003**	**0.2596**	**9.4200e-003**	**0.2690**	**0.0697**	**9.2200e-003**	**0.0789**	**59.6874**	**488.7888**	**548.4761**	**4.1547**	**0.0510**	**667.5344**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7656	2.0000e-005	1.7700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4500e-003	3.4500e-003	1.0000e-005	0.0000	3.6700e-003
Energy	3.6900e-003	0.0336	0.0282	2.0000e-004		2.5500e-003	2.5500e-003		2.5500e-003	2.5500e-003	0.0000	180.0066	180.0066	0.0124	2.0800e-003	180.9365
Mobile	0.1691	0.3320	1.6398	2.8200e-003	0.2596	3.5100e-003	0.2631	0.0697	3.3100e-003	0.0730	0.0000	262.5011	262.5011	0.0188	0.0155	267.6019
Stationary	7.2200e-003	0.0377	0.0313	3.0000e-005		3.3500e-003	3.3500e-003		3.3500e-003	3.3500e-003	0.0000	3.3510	3.3510	4.7000e-004	0.0000	3.3628
Waste						0.0000	0.0000		0.0000	0.0000	36.8875	0.0000	36.8875	2.1800	0.0000	91.3873
Water						0.0000	0.0000		0.0000	0.0000	13.5780	42.9266	56.5046	1.3981	0.0334	101.3954
Total	**0.9456**	**0.4032**	**1.7011**	**3.0500e-003**	**0.2596**	**9.4200e-003**	**0.2690**	**0.0697**	**9.2200e-003**	**0.0789**	**50.4655**	**488.7888**	**539.2542**	**3.6097**	**0.0510**	**644.6876**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**15.45**	**0.00**	**1.68**	**13.12**	**0.00**	**3.42**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.3 Vegetation

Vegetation

	CO2e
Category	MT
Vegetation Land Change	-30.1700
Total	**-30.1700**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/1/2022	5/6/2022	5	5	
2	Site Preparation	Site Preparation	5/28/2022	6/10/2022	5	10	
3	Grading	Grading	6/11/2022	7/22/2022	5	30	
4	Building Construction	Building Construction	7/23/2022	9/15/2023	5	300	
5	Paving	Paving	9/16/2023	10/13/2023	5	20	
6	Architectural Coating	Architectural Coating	10/14/2023	11/10/2023	5	20	
7	Trenching	Trenching	6/13/2022	7/1/2022	5	15	

Acres of Grading (Site Preparation Phase): 7

Acres of Grading (Grading Phase): 30

Acres of Paving: 7

Royal Gold Soil Operation - Humboldt County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 10,000; Non-Residential Outdoor: 5,000; Striped Parking Area: 18,295 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Trenching	Trenchers	2	8.00	78	0.50
Trenching	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	206.00	80.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	41.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	4	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.6000e-003	0.0643	0.0515	1.0000e-004		3.1100e-003	3.1100e-003		2.8900e-003	2.8900e-003	0.0000	8.4976	8.4976	2.3900e-003	0.0000	8.5572
Total	**6.6000e-003**	**0.0643**	**0.0515**	**1.0000e-004**		**3.1100e-003**	**3.1100e-003**		**2.8900e-003**	**2.8900e-003**	**0.0000**	**8.4976**	**8.4976**	**2.3900e-003**	**0.0000**	**8.5572**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-004	2.2000e-004	1.9900e-003	0.0000	4.5000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3869	0.3869	2.0000e-005	2.0000e-005	0.3917
Total	**2.8000e-004**	**2.2000e-004**	**1.9900e-003**	**0.0000**	**4.5000e-004**	**0.0000**	**4.5000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3869**	**0.3869**	**2.0000e-005**	**2.0000e-005**	**0.3917**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.6000e-003	0.0643	0.0515	1.0000e-004		3.1100e-003	3.1100e-003		2.8900e-003	2.8900e-003	0.0000	8.4976	8.4976	2.3900e-003	0.0000	8.5572
Total	**6.6000e-003**	**0.0643**	**0.0515**	**1.0000e-004**		**3.1100e-003**	**3.1100e-003**		**2.8900e-003**	**2.8900e-003**	**0.0000**	**8.4976**	**8.4976**	**2.3900e-003**	**0.0000**	**8.5572**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-004	2.2000e-004	1.9900e-003	0.0000	4.5000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3869	0.3869	2.0000e-005	2.0000e-005	0.3917
Total	**2.8000e-004**	**2.2000e-004**	**1.9900e-003**	**0.0000**	**4.5000e-004**	**0.0000**	**4.5000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3869**	**0.3869**	**2.0000e-005**	**2.0000e-005**	**0.3917**

3.3 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0940	0.0000	0.0940	0.0501	0.0000	0.0501	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0159	0.1654	0.0985	1.9000e-004		8.0600e-003	8.0600e-003		7.4200e-003	7.4200e-003	0.0000	16.7197	16.7197	5.4100e-003	0.0000	16.8549
Total	**0.0159**	**0.1654**	**0.0985**	**1.9000e-004**	**0.0940**	**8.0600e-003**	**0.1021**	**0.0501**	**7.4200e-003**	**0.0575**	**0.0000**	**16.7197**	**16.7197**	**5.4100e-003**	**0.0000**	**16.8549**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.7000e-004	5.2000e-004	4.7800e-003	1.0000e-005	1.0800e-003	1.0000e-005	1.0900e-003	2.9000e-004	1.0000e-005	2.9000e-004	0.0000	0.9285	0.9285	4.0000e-005	4.0000e-005	0.9401
Total	**6.7000e-004**	**5.2000e-004**	**4.7800e-003**	**1.0000e-005**	**1.0800e-003**	**1.0000e-005**	**1.0900e-003**	**2.9000e-004**	**1.0000e-005**	**2.9000e-004**	**0.0000**	**0.9285**	**0.9285**	**4.0000e-005**	**4.0000e-005**	**0.9401**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0367	0.0000	0.0367	0.0195	0.0000	0.0195	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0159	0.1654	0.0985	1.9000e-004		8.0600e-003	8.0600e-003		7.4200e-003	7.4200e-003	0.0000	16.7197	16.7197	5.4100e-003	0.0000	16.8549
Total	**0.0159**	**0.1654**	**0.0985**	**1.9000e-004**	**0.0367**	**8.0600e-003**	**0.0447**	**0.0195**	**7.4200e-003**	**0.0269**	**0.0000**	**16.7197**	**16.7197**	**5.4100e-003**	**0.0000**	**16.8549**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.7000e-004	5.2000e-004	4.7800e-003	1.0000e-005	1.0800e-003	1.0000e-005	1.0900e-003	2.9000e-004	1.0000e-005	2.9000e-004	0.0000	0.9285	0.9285	4.0000e-005	4.0000e-005	0.9401
Total	**6.7000e-004**	**5.2000e-004**	**4.7800e-003**	**1.0000e-005**	**1.0800e-003**	**1.0000e-005**	**1.0900e-003**	**2.9000e-004**	**1.0000e-005**	**2.9000e-004**	**0.0000**	**0.9285**	**0.9285**	**4.0000e-005**	**4.0000e-005**	**0.9401**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1062	0.0000	0.1062	0.0514	0.0000	0.0514	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0544	0.5827	0.4356	9.3000e-004		0.0245	0.0245		0.0226	0.0226	0.0000	81.8019	81.8019	0.0265	0.0000	82.4633
Total	**0.0544**	**0.5827**	**0.4356**	**9.3000e-004**	**0.1062**	**0.0245**	**0.1308**	**0.0514**	**0.0226**	**0.0739**	**0.0000**	**81.8019**	**81.8019**	**0.0265**	**0.0000**	**82.4633**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2400e-003	1.7200e-003	0.0160	3.0000e-005	3.6000e-003	3.0000e-005	3.6200e-003	9.6000e-004	2.0000e-005	9.8000e-004	0.0000	3.0949	3.0949	1.2000e-004	1.2000e-004	3.1337
Total	**2.2400e-003**	**1.7200e-003**	**0.0160**	**3.0000e-005**	**3.6000e-003**	**3.0000e-005**	**3.6200e-003**	**9.6000e-004**	**2.0000e-005**	**9.8000e-004**	**0.0000**	**3.0949**	**3.0949**	**1.2000e-004**	**1.2000e-004**	**3.1337**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0414	0.0000	0.0414	0.0200	0.0000	0.0200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0544	0.5827	0.4356	9.3000e-004		0.0245	0.0245		0.0226	0.0226	0.0000	81.8018	81.8018	0.0265	0.0000	82.4632
Total	**0.0544**	**0.5827**	**0.4356**	**9.3000e-004**	**0.0414**	**0.0245**	**0.0660**	**0.0200**	**0.0226**	**0.0426**	**0.0000**	**81.8018**	**81.8018**	**0.0265**	**0.0000**	**82.4632**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2400e-003	1.7200e-003	0.0160	3.0000e-005	3.6000e-003	3.0000e-005	3.6200e-003	9.6000e-004	2.0000e-005	9.8000e-004	0.0000	3.0949	3.0949	1.2000e-004	1.2000e-004	3.1337
Total	**2.2400e-003**	**1.7200e-003**	**0.0160**	**3.0000e-005**	**3.6000e-003**	**3.0000e-005**	**3.6200e-003**	**9.6000e-004**	**2.0000e-005**	**9.8000e-004**	**0.0000**	**3.0949**	**3.0949**	**1.2000e-004**	**1.2000e-004**	**3.1337**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0981	0.8979	0.9409	1.5500e-003		0.0465	0.0465		0.0438	0.0438	0.0000	133.2420	133.2420	0.0319	0.0000	134.0400
Total	**0.0981**	**0.8979**	**0.9409**	**1.5500e-003**		**0.0465**	**0.0465**		**0.0438**	**0.0438**	**0.0000**	**133.2420**	**133.2420**	**0.0319**	**0.0000**	**134.0400**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0126	0.2883	0.0855	9.2000e-004	0.0267	2.7800e-003	0.0295	7.7500e-003	2.6600e-003	0.0104	0.0000	88.1410	88.1410	5.5000e-004	0.0126	91.9220
Worker	0.0885	0.0680	0.6297	1.3200e-003	0.1420	9.9000e-004	0.1430	0.0378	9.1000e-004	0.0388	0.0000	122.1980	122.1980	4.7600e-003	4.7400e-003	123.7294
Total	**0.1010**	**0.3563**	**0.7152**	**2.2400e-003**	**0.1687**	**3.7700e-003**	**0.1725**	**0.0456**	**3.5700e-003**	**0.0492**	**0.0000**	**210.3391**	**210.3391**	**5.3100e-003**	**0.0174**	**215.6514**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0981	0.8979	0.9409	1.5500e-003		0.0465	0.0465		0.0438	0.0438	0.0000	133.2419	133.2419	0.0319	0.0000	134.0399
Total	**0.0981**	**0.8979**	**0.9409**	**1.5500e-003**		**0.0465**	**0.0465**		**0.0438**	**0.0438**	**0.0000**	**133.2419**	**133.2419**	**0.0319**	**0.0000**	**134.0399**

Royal Gold Soil Operation - Humboldt County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0126	0.2883	0.0855	9.2000e-004	0.0267	2.7800e-003	0.0295	7.7500e-003	2.6600e-003	0.0104	0.0000	88.1410	88.1410	5.5000e-004	0.0126	91.9220
Worker	0.0885	0.0680	0.6297	1.3200e-003	0.1420	9.9000e-004	0.1430	0.0378	9.1000e-004	0.0388	0.0000	122.1980	122.1980	4.7600e-003	4.7400e-003	123.7294
Total	**0.1010**	**0.3563**	**0.7152**	**2.2400e-003**	**0.1687**	**3.7700e-003**	**0.1725**	**0.0456**	**3.5700e-003**	**0.0492**	**0.0000**	**210.3391**	**210.3391**	**5.3100e-003**	**0.0174**	**215.6514**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1455	1.3306	1.5026	2.4900e-003		0.0647	0.0647		0.0609	0.0609	0.0000	214.4194	214.4194	0.0510	0.0000	215.6946
Total	**0.1455**	**1.3306**	**1.5026**	**2.4900e-003**		**0.0647**	**0.0647**		**0.0609**	**0.0609**	**0.0000**	**214.4194**	**214.4194**	**0.0510**	**0.0000**	**215.6946**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0143	0.3936	0.1239	1.4400e-003	0.0430	2.5300e-003	0.0455	0.0125	2.4200e-003	0.0149	0.0000	137.4439	137.4439	6.3000e-004	0.0196	143.2872
Worker	0.1340	0.0968	0.9202	2.0700e-003	0.2285	1.4800e-003	0.2300	0.0609	1.3700e-003	0.0623	0.0000	191.9409	191.9409	6.8800e-003	6.9700e-003	194.1895
Total	**0.1482**	**0.4904**	**1.0440**	**3.5100e-003**	**0.2715**	**4.0100e-003**	**0.2755**	**0.0734**	**3.7900e-003**	**0.0772**	**0.0000**	**329.3848**	**329.3848**	**7.5100e-003**	**0.0265**	**337.4766**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1455	1.3306	1.5026	2.4900e-003		0.0647	0.0647		0.0609	0.0609	0.0000	214.4191	214.4191	0.0510	0.0000	215.6943
Total	**0.1455**	**1.3306**	**1.5026**	**2.4900e-003**		**0.0647**	**0.0647**		**0.0609**	**0.0609**	**0.0000**	**214.4191**	**214.4191**	**0.0510**	**0.0000**	**215.6943**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0143	0.3936	0.1239	1.4400e-003	0.0430	2.5300e-003	0.0455	0.0125	2.4200e-003	0.0149	0.0000	137.4439	137.4439	6.3000e-004	0.0196	143.2872
Worker	0.1340	0.0968	0.9202	2.0700e-003	0.2285	1.4800e-003	0.2300	0.0609	1.3700e-003	0.0623	0.0000	191.9409	191.9409	6.8800e-003	6.9700e-003	194.1895
Total	**0.1482**	**0.4904**	**1.0440**	**3.5100e-003**	**0.2715**	**4.0100e-003**	**0.2755**	**0.0734**	**3.7900e-003**	**0.0772**	**0.0000**	**329.3848**	**329.3848**	**7.5100e-003**	**0.0265**	**337.4766**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0103	0.1019	0.1458	2.3000e-004		5.1000e-003	5.1000e-003		4.6900e-003	4.6900e-003	0.0000	20.0269	20.0269	6.4800e-003	0.0000	20.1888
Paving	9.1700e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0195**	**0.1019**	**0.1458**	**2.3000e-004**		**5.1000e-003**	**5.1000e-003**		**4.6900e-003**	**4.6900e-003**	**0.0000**	**20.0269**	**20.0269**	**6.4800e-003**	**0.0000**	**20.1888**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0500e-003	7.6000e-004	7.2400e-003	2.0000e-005	1.8000e-003	1.0000e-005	1.8100e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.5110	1.5110	5.0000e-005	5.0000e-005	1.5287
Total	**1.0500e-003**	**7.6000e-004**	**7.2400e-003**	**2.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8100e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.5110**	**1.5110**	**5.0000e-005**	**5.0000e-005**	**1.5287**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0103	0.1019	0.1458	2.3000e-004		5.1000e-003	5.1000e-003		4.6900e-003	4.6900e-003	0.0000	20.0268	20.0268	6.4800e-003	0.0000	20.1888
Paving	9.1700e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0195**	**0.1019**	**0.1458**	**2.3000e-004**		**5.1000e-003**	**5.1000e-003**		**4.6900e-003**	**4.6900e-003**	**0.0000**	**20.0268**	**20.0268**	**6.4800e-003**	**0.0000**	**20.1888**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0500e-003	7.6000e-004	7.2400e-003	2.0000e-005	1.8000e-003	1.0000e-005	1.8100e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.5110	1.5110	5.0000e-005	5.0000e-005	1.5287
Total	**1.0500e-003**	**7.6000e-004**	**7.2400e-003**	**2.0000e-005**	**1.8000e-003**	**1.0000e-005**	**1.8100e-003**	**4.8000e-004**	**1.0000e-005**	**4.9000e-004**	**0.0000**	**1.5110**	**1.5110**	**5.0000e-005**	**5.0000e-005**	**1.5287**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1929					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9200e-003	0.0130	0.0181	3.0000e-005		7.1000e-004	7.1000e-004		7.1000e-004	7.1000e-004	0.0000	2.5533	2.5533	1.5000e-004	0.0000	2.5571
Total	**0.1948**	**0.0130**	**0.0181**	**3.0000e-005**		**7.1000e-004**	**7.1000e-004**		**7.1000e-004**	**7.1000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.5000e-004**	**0.0000**	**2.5571**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8800e-003	2.0800e-003	0.0198	4.0000e-005	4.9200e-003	3.0000e-005	4.9500e-003	1.3100e-003	3.0000e-005	1.3400e-003	0.0000	4.1299	4.1299	1.5000e-004	1.5000e-004	4.1783
Total	**2.8800e-003**	**2.0800e-003**	**0.0198**	**4.0000e-005**	**4.9200e-003**	**3.0000e-005**	**4.9500e-003**	**1.3100e-003**	**3.0000e-005**	**1.3400e-003**	**0.0000**	**4.1299**	**4.1299**	**1.5000e-004**	**1.5000e-004**	**4.1783**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1929					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9200e-003	0.0130	0.0181	3.0000e-005		7.1000e-004	7.1000e-004		7.1000e-004	7.1000e-004	0.0000	2.5533	2.5533	1.5000e-004	0.0000	2.5571
Total	**0.1948**	**0.0130**	**0.0181**	**3.0000e-005**		**7.1000e-004**	**7.1000e-004**		**7.1000e-004**	**7.1000e-004**	**0.0000**	**2.5533**	**2.5533**	**1.5000e-004**	**0.0000**	**2.5571**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8800e-003	2.0800e-003	0.0198	4.0000e-005	4.9200e-003	3.0000e-005	4.9500e-003	1.3100e-003	3.0000e-005	1.3400e-003	0.0000	4.1299	4.1299	1.5000e-004	1.5000e-004	4.1783
Total	**2.8800e-003**	**2.0800e-003**	**0.0198**	**4.0000e-005**	**4.9200e-003**	**3.0000e-005**	**4.9500e-003**	**1.3100e-003**	**3.0000e-005**	**1.3400e-003**	**0.0000**	**4.1299**	**4.1299**	**1.5000e-004**	**1.5000e-004**	**4.1783**

3.8 Trenching - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.9500e-003	0.0760	0.0726	1.0000e-004		4.9600e-003	4.9600e-003		4.5600e-003	4.5600e-003	0.0000	8.5539	8.5539	2.7700e-003	0.0000	8.6230
Total	**7.9500e-003**	**0.0760**	**0.0726**	**1.0000e-004**		**4.9600e-003**	**4.9600e-003**		**4.5600e-003**	**4.5600e-003**	**0.0000**	**8.5539**	**8.5539**	**2.7700e-003**	**0.0000**	**8.6230**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.8 Trenching - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.3000e-004	3.9900e-003	1.0000e-005	9.0000e-004	1.0000e-005	9.1000e-004	2.4000e-004	1.0000e-005	2.5000e-004	0.0000	0.7737	0.7737	3.0000e-005	3.0000e-005	0.7834
Total	**5.6000e-004**	**4.3000e-004**	**3.9900e-003**	**1.0000e-005**	**9.0000e-004**	**1.0000e-005**	**9.1000e-004**	**2.4000e-004**	**1.0000e-005**	**2.5000e-004**	**0.0000**	**0.7737**	**0.7737**	**3.0000e-005**	**3.0000e-005**	**0.7834**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.9500e-003	0.0760	0.0726	1.0000e-004		4.9600e-003	4.9600e-003		4.5600e-003	4.5600e-003	0.0000	8.5539	8.5539	2.7700e-003	0.0000	8.6230
Total	**7.9500e-003**	**0.0760**	**0.0726**	**1.0000e-004**		**4.9600e-003**	**4.9600e-003**		**4.5600e-003**	**4.5600e-003**	**0.0000**	**8.5539**	**8.5539**	**2.7700e-003**	**0.0000**	**8.6230**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.8 Trenching - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.3000e-004	3.9900e-003	1.0000e-005	9.0000e-004	1.0000e-005	9.1000e-004	2.4000e-004	1.0000e-005	2.5000e-004	0.0000	0.7737	0.7737	3.0000e-005	3.0000e-005	0.7834
Total	**5.6000e-004**	**4.3000e-004**	**3.9900e-003**	**1.0000e-005**	**9.0000e-004**	**1.0000e-005**	**9.1000e-004**	**2.4000e-004**	**1.0000e-005**	**2.5000e-004**	**0.0000**	**0.7737**	**0.7737**	**3.0000e-005**	**3.0000e-005**	**0.7834**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1691	0.3320	1.6398	2.8200e-003	0.2596	3.5100e-003	0.2631	0.0697	3.3100e-003	0.0730	0.0000	262.5011	262.5011	0.0188	0.0155	267.6019
Unmitigated	0.1691	0.3320	1.6398	2.8200e-003	0.2596	3.5100e-003	0.2631	0.0697	3.3100e-003	0.0730	0.0000	262.5011	262.5011	0.0188	0.0155	267.6019

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	16.00	16.00	16.00	44,173	44,173
Manufacturing	162.29	162.29	162.29	626,983	626,983
Other Asphalt Surfaces	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	12.00	12.00	12.00	46,362	46,362
Total	190.29	190.29	190.29	717,517	717,517

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	14.70	6.60	6.60	33.00	48.00	19.00	77	19	4
Manufacturing	14.70	6.60	6.60	59.00	28.00	13.00	92	5	3
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	14.70	6.60	6.60	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.443629	0.069650	0.207187	0.154075	0.057336	0.011288	0.006778	0.008856	0.000975	0.000221	0.034425	0.001490	0.004089
Manufacturing	0.443629	0.069650	0.207187	0.154075	0.057336	0.011288	0.006778	0.008856	0.000975	0.000221	0.034425	0.001490	0.004089
Other Asphalt Surfaces	0.443629	0.069650	0.207187	0.154075	0.057336	0.011288	0.006778	0.008856	0.000975	0.000221	0.034425	0.001490	0.004089
Unrefrigerated Warehouse-No Rail	0.443629	0.069650	0.207187	0.154075	0.057336	0.011288	0.006778	0.008856	0.000975	0.000221	0.034425	0.001490	0.004089

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	143.4727	143.4727	0.0117	1.4100e-003	144.1855
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	143.4727	143.4727	0.0117	1.4100e-003	144.1855
NaturalGas Mitigated	3.6900e-003	0.0336	0.0282	2.0000e-004		2.5500e-003	2.5500e-003		2.5500e-003	2.5500e-003	0.0000	36.5339	36.5339	7.0000e-004	6.7000e-004	36.7510
NaturalGas Unmitigated	3.6900e-003	0.0336	0.0282	2.0000e-004		2.5500e-003	2.5500e-003		2.5500e-003	2.5500e-003	0.0000	36.5339	36.5339	7.0000e-004	6.7000e-004	36.7510

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	77360	4.2000e-004	3.7900e-003	3.1900e-003	2.0000e-005		2.9000e-004	2.9000e-004		2.9000e-004	2.9000e-004	0.0000	4.1282	4.1282	8.0000e-005	8.0000e-005	4.1528
Manufacturing	607260	3.2700e-003	0.0298	0.0250	1.8000e-004		2.2600e-003	2.2600e-003		2.2600e-003	2.2600e-003	0.0000	32.4057	32.4057	6.2000e-004	5.9000e-004	32.5983
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**3.6900e-003**	**0.0336**	**0.0282**	**2.0000e-004**		**2.5500e-003**	**2.5500e-003**		**2.5500e-003**	**2.5500e-003**	**0.0000**	**36.5339**	**36.5339**	**7.0000e-004**	**6.7000e-004**	**36.7510**

Royal Gold Soil Operation - Humboldt County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	77360	4.2000e-004	3.7900e-003	3.1900e-003	2.0000e-005		2.9000e-004	2.9000e-004		2.9000e-004	2.9000e-004	0.0000	4.1282	4.1282	8.0000e-005	8.0000e-005	4.1528
Manufacturing	607260	3.2700e-003	0.0298	0.0250	1.8000e-004		2.2600e-003	2.2600e-003		2.2600e-003	2.2600e-003	0.0000	32.4057	32.4057	6.2000e-004	5.9000e-004	32.5983
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**3.6900e-003**	**0.0336**	**0.0282**	**2.0000e-004**		**2.5500e-003**	**2.5500e-003**		**2.5500e-003**	**2.5500e-003**	**0.0000**	**36.5339**	**36.5339**	**7.0000e-004**	**6.7000e-004**	**36.7510**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	42720	7.8669	6.4000e-004	8.0000e-005	7.9060
Manufacturing	736390	135.6058	0.0110	1.3400e-003	136.2795
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**143.4727**	**0.0117**	**1.4200e-003**	**144.1855**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	42720	7.8669	6.4000e-004	8.0000e-005	7.9060
Manufacturing	736390	135.6058	0.0110	1.3400e-003	136.2795
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	0	0.0000	0.0000	0.0000	0.0000
Total		**143.4727**	**0.0117**	**1.4200e-003**	**144.1855**

6.0 Area Detail

6.1 Mitigation Measures Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.7656	2.0000e-005	1.7700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4500e-003	3.4500e-003	1.0000e-005	0.0000	3.6700e-003
Unmitigated	0.7656	2.0000e-005	1.7700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4500e-003	3.4500e-003	1.0000e-005	0.0000	3.6700e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0193					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7461					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6000e-004	2.0000e-005	1.7700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4500e-003	3.4500e-003	1.0000e-005	0.0000	3.6700e-003
Total	**0.7656**	**2.0000e-005**	**1.7700e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.4500e-003**	**3.4500e-003**	**1.0000e-005**	**0.0000**	**3.6700e-003**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0193					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7461					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6000e-004	2.0000e-005	1.7700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.4500e-003	3.4500e-003	1.0000e-005	0.0000	3.6700e-003
Total	**0.7656**	**2.0000e-005**	**1.7700e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.4500e-003**	**3.4500e-003**	**1.0000e-005**	**0.0000**	**3.6700e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	56.5046	1.3981	0.0334	101.3954
Unmitigated	56.5046	1.3981	0.0334	101.3954

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	0.710935 / 0.435734	1.2148	0.0233	5.6000e-004	1.9619
Manufacturing	40.3531 / 0	53.0114	1.3182	0.0314	95.3361
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1.73438 / 0	2.2784	0.0567	1.3500e-003	4.0975
Total		**56.5046**	**1.3981**	**0.0334**	**101.3954**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	0.710935 / 0.435734	1.2148	0.0233	5.6000e-004	1.9619
Manufacturing	40.3531 / 0	53.0114	1.3182	0.0314	95.3361
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1.73438 / 0	2.2784	0.0567	1.3500e-003	4.0975
Total		**56.5046**	**1.3981**	**0.0334**	**101.3954**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	36.8875	2.1800	0.0000	91.3873
Unmitigated	46.1094	2.7250	0.0000	114.2341

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	3.72	0.7551	0.0446	0.0000	1.8708
Manufacturing	216.38	43.9232	2.5958	0.0000	108.8178
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	7.05	1.4311	0.0846	0.0000	3.5455
Total		**46.1094**	**2.7250**	**0.0000**	**114.2341**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	2.976	0.6041	0.0357	0.0000	1.4966
Manufacturing	173.104	35.1386	2.0766	0.0000	87.0543
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	5.64	1.1449	0.0677	0.0000	2.8364
Total		**36.8875**	**2.1800**	**0.0000**	**91.3873**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
Emergency Generator	1	0	100	42	0.73	Diesel
Emergency Generator	1	0	100	31.5	0.73	Diesel
Emergency Generator	1	0	100	9.4	0.73	Diesel
Emergency Generator	1	0	100	4	0.73	Diesel

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Emergency Generator	1	0	100	2.7	0.73	Diesel

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

10.1 Stationary Sources

Unmitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Emergency Generator - Diesel (0 - 11 HP)	1.2300e-003	6.4200e-003	7.2100e-003	1.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004	0.0000	0.5712	0.5712	8.0000e-005	0.0000	0.5732
Emergency Generator - Diesel (25 - 50 HP)	5.9900e-003	0.0312	0.0241	3.0000e-005		2.6300e-003	2.6300e-003		2.6300e-003	2.6300e-003	0.0000	2.7798	2.7798	3.9000e-004	0.0000	2.7896
Total	**7.2200e-003**	**0.0377**	**0.0313**	**4.0000e-005**		**3.3500e-003**	**3.3500e-003**		**3.3500e-003**	**3.3500e-003**	**0.0000**	**3.3510**	**3.3510**	**4.7000e-004**	**0.0000**	**3.3628**

11.0 Vegetation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	-30.1700	0.0000	0.0000	-30.1700

11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Grassland	7 / 0	-30.1700	0.0000	0.0000	-30.1700
Total		**-30.1700**	**0.0000**	**0.0000**	**-30.1700**

Odor Impact Minimization Plan

5.4

ODOR IMPACT MINIMIZATION PLAN

Agricultural Material Composting Operation

SWIS Facility File # 12-AA-0129

Updated December 2020

Background

Royal Gold LLC is a soil production operation located at 1689 Glendale Drive in the unincorporated community of Glendale in Humboldt County. The soil operation site is located on fourteen separate parcels on the north side of Glendale Drive (APN 516-101-008, -017, -040, -041, -060, -063, -064, -068, -079, -081, -083, -084 & 516-111-062, -063) that have been used for industrial purposes since the 1950s. Attached is the Site Plan for the Royal Gold operation, which shows the existing site layout and proposed site improvements.

Pursuant to 14 CCR § 17852 and § 17856, Royal Gold is defined as an Agricultural Material Composting Operation that is required to submit a notification to the Local Enforcement Agency (LEA), which is the Humboldt County Division of Environmental Health. Royal Gold submitted the notification in 2014 to the LEA for the handling of commercially produced compost and softwood sawdust as part of their soil production activities. Softwood sawdust is mixed with a proprietary blend of amendments and aged to produce aged forest humus. The sawdust, forest humus and commercially produced compost all have the potential to generate odors.

Due to the potential for these materials to generate odors that could impact surrounding sensitive receptors (e.g., residences), the LEA required Royal Gold to prepare an Odor Impact Minimization Plan (OIMP). This OIMP has been prepared pursuant to the requirements of 14 CCR § 17863.4 and the specific measures to be implemented by Royal Gold to reduce odor impacts to surrounding sensitive receptors is described in detail below.

Odor Impact Minimization Measures

To reduce potential odor impacts from the Royal Gold soil operation, the following measures will be implemented:

1) **Odor Monitoring Protocol**

    a) Proximity of potential odor receptors: Potential odor receptors include residences adjacent to the southern, eastern, and western boundaries of the soil production site, patrons at E&O Bowl, and customers at Murphy's Market. All operations that have the potential to generate odors are located as far from odor receptors as possible.

    b) Method for assessing potential odor impacts to odor receptors: Royal Gold staff will perform daily assessments of the entire site to determine if there is the potential for impacts to surrounding odor receptors. Assessments will be made by personnel coming from an odor free environment to ensure accurate assessment. All

production operations will be inspected each working day to prevent anaerobic conditions in material stockpiles and excess odor production.

2) Meteorological Conditions Affecting Migration of Odors

a) The prevailing winds in the project area are from the northwest. Operations will be located in the least wind prone sections of the site and furthest away from potential odor receptors.

b) Seasonal variations that affect wind velocity and direction: Local meteorological conditions include late fall, winter and early spring storms that temporarily change wind direction and increase wind velocity with a difference in the location of storm cells. These storms are typically associated with rain as well, which acts as an odor suppressant during the high winds.

3) Complaint Response Protocol

a) Training

- All appropriate staff will be trained in the following ways: 1) recognizing potentially offensive odors and the conditions that cause them; 2) how to implement effective methods for minimizing odors; and 3) how to follow the complaint response protocol.

b) Official Complaint Response Protocol:

- If a complaint is received, document the reason for the complaint and the name, address, and contact phone number of the person issuing the complaint on an "Odor Complaint Form". Forward the "Odor Complaint Form" to the General Manager, Quality Control Manager and Environmental Manager the same day that the complaint is received.

- Always be courteous and acknowledge the concern of the complainant. Regardless of a complainants' disposition, they are to be treated with respect.

- Go to the site of complaint origin to confirm the presence of odors. (Document all findings and file with the "Odor Complaint Form")

- If an odor is detected, trace it back to try to determine the exact source. (Document all findings and file with the "Odor Complaint Form")

- Determine the quickest and most effective method to reduce and/or eliminate the odor at its source. (Document all findings and file with the "Odor Complaint Form")

- After appropriate action is taken, re-assess odor source and the origin of the complaint to ensure the minimization measures are effective. (Document all findings and file with the "Odor Complaint Form")

- Once the odor issue has been adequately addressed, notify the complainant of the actions that have been taken to respond to their complaint.

4) Design Considerations for Minimizing Odor

a) Aeration: Aging forest humus is arranged in windrows to allow proper air penetration while maintaining accessibility with a front-end loader.

b) Moisture Content of Materials: Raw and processed material stockpiles will be maintained at appropriate moisture levels. Levels of moisture deemed appropriate are drier than saturated, where anaerobic decomposition may occur, but with enough moisture to reduce windblown erosion. Windrows will be covered with plastic tarps to repel rain and will further reduce windblown material. Windrows will be monitored for temperature and moisture content. Piles will be turned and hydrated as necessary to maintain proper temperature for appropriate thermophilic period as determined by Humboldt County's Department of Environmental Health (DEH).

c) Feedstock Characteristics: Feedstock will consist of locally produced softwood sawdust from various local re-saw (sawdust) mill sources.

d) Airborne Emission Production: Multiple minimization measures are implemented to address airborne emissions including: 1) planting rows of trees at various location at the site; 2) two water trucks and street sweepers are used on a daily basis; 3) the weather is monitored daily including wind speed and direction; 4) screening, turning, and material moving activities are all scheduled to minimize impacts on surrounding sensitive receptors; and 5) a windsock is used to allow employees to monitor wind direction and velocity.

e) Process Water Distribution: City water is used for material moisture management and odor control around processing activity areas and is applied with an onsite water truck.

f) Pad and Site Drainage: All appropriate drains and culverts are kept clear of obstructions so that they are flowing effectively. All appropriate inlets to drainage areas are lined with straw, woven or nonwoven geotextile wattles to capture sediment. Sediment is cleared after each significant precipitation event.

g) Equipment Reliability: Several fully operational front-end loaders are onsite at all times. All machines are inspected and maintained regularly by our maintenance crew.

h) Personnel Training: All appropriate staff are thoroughly trained in our materials handling procedures including: appropriate moisture levels, appropriate temperature levels, appropriate carbon/nitrogen ratios, pathogen reduction techniques, and equipment operation and cleaning.

i) Weather Event Impacts: Stockpile covers, weighed down with large tractor tires, reduce the impact of any weather events or conditions. Covers reduce moisture increase from rain and wind events and reduce evaporation in dry conditions.

j) Utility Service Interruptions: As no electricity is required for the handling and maintenance of material stockpiles, utility interruptions are of little or no consequence to the design consideration and procedures as described.

k) Site Specific Concerns: There are residents who live adjacent to the boundaries of the soil production site. The adjacent residences are located along the southern, western, and eastern boundaries of the site. As noted above, all operations that have the potential to generate odors are located as far from odor receptors as possible. This includes locating the majority of softwood sawdust and forest humus stockpiles in the northern and central portions of the site to increase the distance from adjacent residences.

5) Operating Procedures for Minimizing Odor

a) Aeration: All active material stockpiles will be monitored each working day for proper moisture content and temperature. All stockpiles will be turned to maintain proper temperatures, as determined by DEH and hydrated when necessary. All stockpiles will be covered with plastic tarps to prevent over saturation and anaerobic conditions when not being actively used.

b) Moisture Management: The use of plastic tarps to cover material stockpiles is an important component of managing the moisture level in the stockpiles. Dry input material is also kept onsite so that it can be added to the stockpiles to balance the moisture level if a pile becomes over saturated.

c) Feedstock Quality: There is a proprietary set of strict quality control parameters for feedstock.

d) Drainage Controls: All appropriate drains and culverts will be kept free of debris so that they are flowing effectively. Sediment will be controlled by straw, woven and nonwoven geotextile wattles as well as other effective BMP's. Sediment is cleared after each significant precipitation event.

e) Pad Maintenance: Pads will be cleaned daily, and as necessary to prevent odors.

f) Wastewater Pond Controls: N/A

g) Storage Practices: The primary storage for all feedstock and finished materials is located in the central southern and central northern portions of the site. Storage times vary greatly depending on 1) if it is raw feedstock or finished material and 2) how many orders are placed for bagged and bulk products. Raw sawdust is usually stored in multiple piles and under tarps when feasible unless being actively worked on. Forest humus is aged in piles that are rolled once a week and then is screened once properly aged. Finished compost, purchased from a permitted compost facility, is stored under the pole-shed style structure along the southeastern boundary of the site (APNs 516-101-060 and 516-111-063) and in tarped/covered bins. The stockpiles that are used for bulk soil products are stored in piles and covered by tarps unless being actively used.

h) Contingency Plans:

- Equipment - Several front-end loaders are onsite at all times, so that in the event of breakdowns, there is always sufficient equipment to address potential odor issues.

- Water - There are multiple water access points, water storage tanks, and water trucks onsite to ensure a consistent supply is available to address potential odor issues.

- Power - The equipment used for the soil operation is powered by diesel fuel. The operation has an onsite fuel tank as well as delivery accounts with multiple distributors to ensure adequate supply and access of fuel. Electricity is not required for any activities that would be implemented to address odor issues.

- Personnel - Multiple staff members are trained in all materials handling procedures so that there is always a staff member onsite that is available to address odor issues and complaints.

i) Biofiltration: N/A

j) Tarping: All raw material stockpiles are covered with tarps, unless the stockpile is actively being used.

Updated Biological Report

5.5

Updated Biological Report

Royal Gold, LLC
1689 Glendale Drive
Glendale, California

Prepared for:

Royal Gold, LLC

November 2021

Revision 1

016098

Phone: (707) 822-5785 **Email:** info@shn-engr.com
Web: shn-engr.com • 1062 G Street, Ste. I, Arcata, CA 95521-5800

Updated Biological Report

Royal Gold, LLC
1689 Glendale Drive
Glendale, California

Prepared for:
Royal Gold, LLC

Prepared by:

1062 G St., Suite I
Arcata, CA 95521-5800
707-822-5785

November 2021
Revision 1

QA/QC: GCR____
Reference: 016098

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Appendices

List of Illustrations

Figures **Follows Page**

Abbreviations and Acronyms

Measurement Terms

%	percentage
C	Celsius
cm	centimeter
ft	feet
km	kilometer
m	meter
mg/L	milligrams per liter
mi	mile
m/sec	meters per second
ppm	parts per million
ppt	parts per thousand
s.f.	square feet

Additional Terms

APN	Assessor's Parcel Number
BIOS	Biogeographical Information and Observation System
BMP	best management practice
C	candidate
Cal-IPC	California Invasive Plant Council
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
COD	chemical oxygen demand
CRPR	California Rare Plant Rank
CT	candidate threatened species status
CWA	Clean Water Act
D	delisted species status
DOS	dissolved organic carbon
DPS	distinct population segment species status
E	endangered species status
EPA	United States Environmental Protection Agency
ESU	evolutionarily significant unit species status
FESA	Federal Endangered Species Act
FP	fully protected species status
G1/S1	critically imperiled species heritage rank
G2/S2	imperiled species heritage rank
G3/S3	vulnerable species heritage rank
G4/S4	apparently secure species heritage rank
G5/S5	secure species heritage rank
GIS	Geographic Information System
IPaC	Information for Planning and Conservation
IGP	Industrial General Permit
LSA	Lake and Streambed Alteration
MBTA	Migratory Bird Treaty Act
NAL	numeric action level
NCCP	Natural Community Conservation Planning
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
O&G	oil and grease
PT	proposed threatened species status
RWQCB	Regional Water Quality Control Board
SIC	Standard Industrial Classification
SMA	Streamside Management Area
SMAWO	Streamside Management Area and Wetlands Ordinance
SSC	species of special concern
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
T	threatened species status
TSS	total suspended solids
U.S.	United States
USC	United States Code
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture

Abbreviations and Acronyms, Continued

USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VegCAMP	Vegetation Classification and Mapping Program
VES	visual encounter surveys
WR	Wetland
WDR	Waste Discharge Requirement
WL	watch list species status
WMMP	Wetland Mitigation and Monitoring Plan

1.0 Introduction

Royal Gold, LLC (Royal Gold) is a premium potting soil and fertilizer manufacturing business located at 1689 Glendale Drive in the unincorporated community of Glendale in Humboldt County (see Figure 1–Project Location). This Updated Biological Report is an update to the previously prepared Biological Survey for the Expansion of Soil Manufacturing Operations for the project site dated August 2017 (Biological Survey Report; see Appendix 1; SHN, 2017). This report has been prepared to support preparation of a California Environmental Quality Act (CEQA) Initial Study that is required as part of the Humboldt County permitting process for the Royal Gold soil manufacturing operation.

Senior Wildlife Biologist, Gretchen O'Brien, conducted a site visit on January 20, 2021 for a habitat assessment and surveys for special-status biological species within the project site for the Royal Gold soil manufacturing operation. Senior Botanist, Joseph Saler, conducted botanical surveys in 2017 and again on April 27, 2021 to document botanical l species within the project site and to determine the presence or absence of special-status botanical species and sensitive natural communities. The study area for biological surveys included the areas currently used by Royal Gold and the areas where the company proposes to expand for full buildout of their facility (see Figure 2–Study Area).

In addition to this Updated Biological Report, a Wetland Delineation (see Appendix 2; SHN, 2018) and a Wetland Mitigation and Monitoring Plan (WMMP) (see Appendix 3; SHN, 2020) have been prepared for the project. These reports document the existing wetlands at the site (see Appendix 2; Figure 3) and the wetlands that have been or are proposed to be impacted by future site development (see Appendix 3; Figure 2). As discussed in the WMMP, Royal Gold is proposing to mitigate wetland impacts onsite at a 2:1 replacement ratio (see Appendix 3; Figure 3).

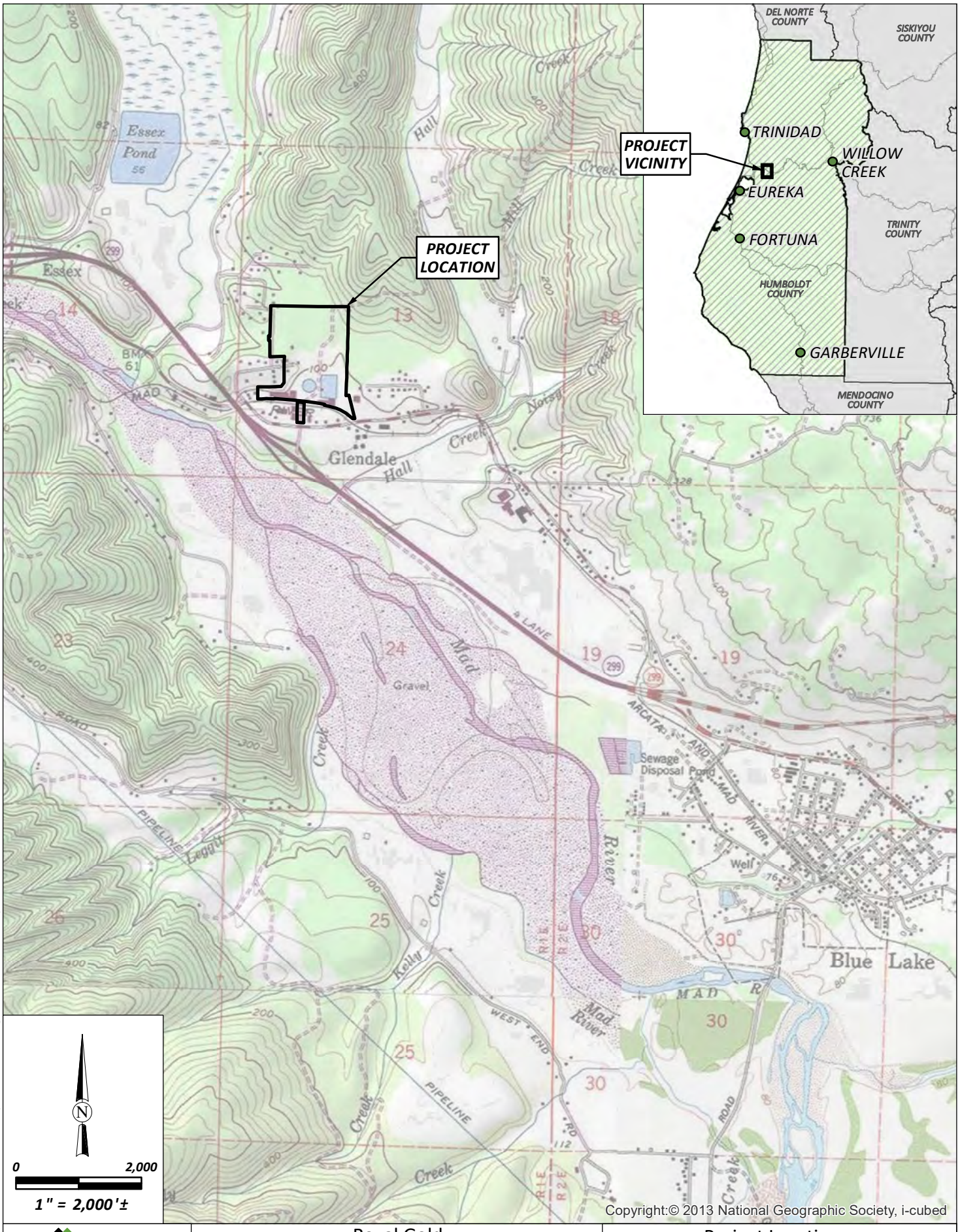
1.1 Project Location

The Royal Gold facility occurs on sixteen parcels north of Glendale Drive: Assessor's Parcel Numbers (APNs) 516-101-005, -008, -017, -040, -041, -060, -063, -064, -068, -079, -081, -083, and -084; 516-111-003, -062, and -063. The parcels containing the Royal Gold soil manufacturing facility total approximately 46 acres. The soil operation facility boundary encompasses approximately 34 acres of these parcels. Therefore, approximately 12 acres of the above listed parcels are not within the facility boundary containing the soil manufacturing activity. The project site is located in the unincorporated community of Glendale, which contains a mixture of commercial, industrial, residential, and agricultural uses.

1.2 Site Description and Environmental Baseline

Prior to Royal Gold's occupancy of the site, several lumber mills operated at the site under multiple different companies since the 1950s. Most recently, Blue Lake Forest Products, Inc. began operation at the site in 1986 and ceased operations in April 2002. Figure 3 is an aerial photo of the site when it was operated by Blue Lake Forest Products. After Blue Lake Forest Products, Inc. ceased operations, Gess Environmental conducted a greenwaste recycling and composting operation on the eastern portion of the site for several years. Royal Gold began operations at the site in March 2009, which is used as the environmental baseline for the CEQA document being prepared for the project.

When Royal Gold moved to the site in 2009, it contained remnants of the former industrial uses, including asphalt and concrete pavement, buildings, compacted gravel surfaces, constructed



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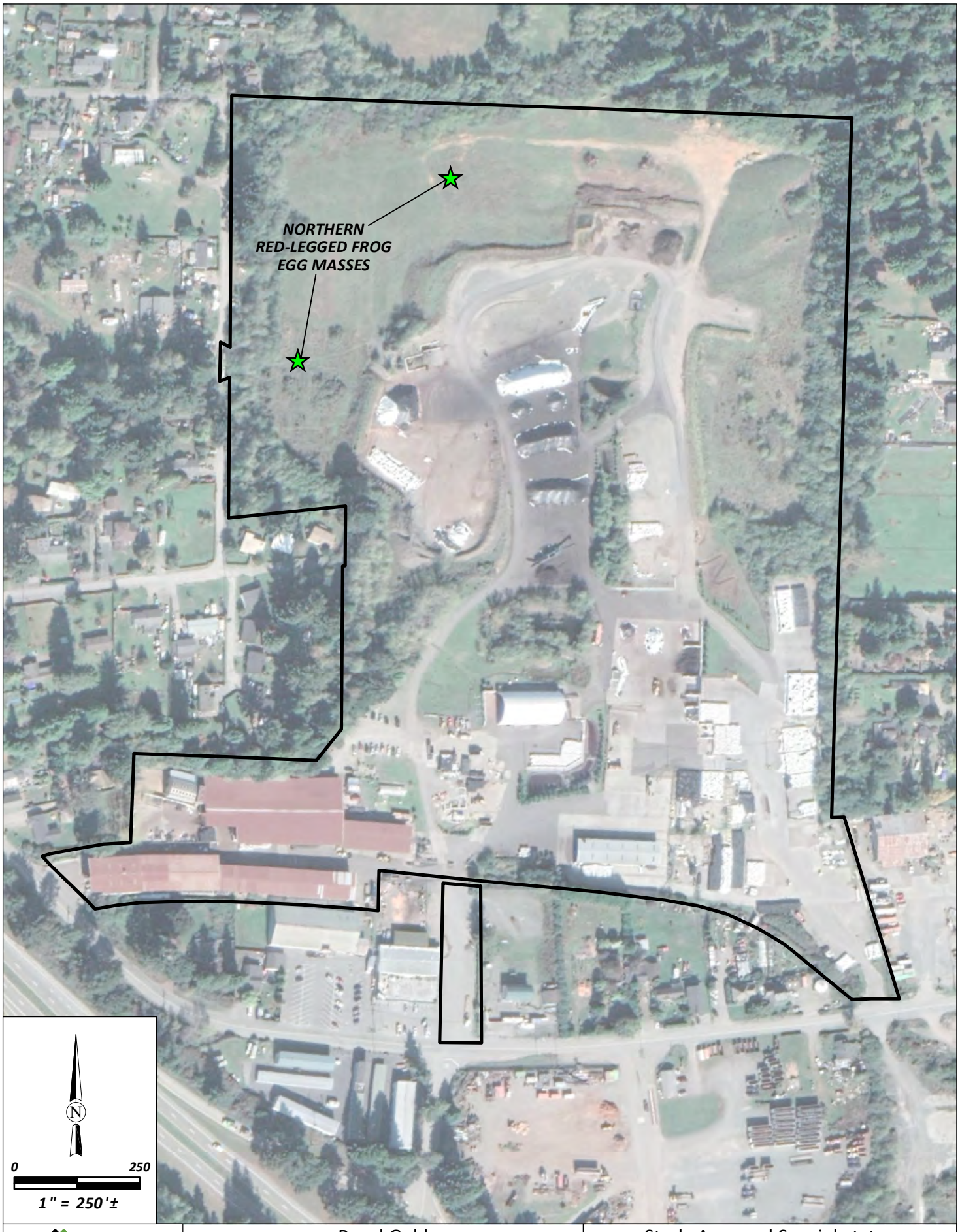
SHN	Royal Gold Updated Biological Report Glendale Drive, Humboldt County, California	Project Location SHN 016098
	June 2021 | BIO2_Fig1_ProjectLocation	Figure 1



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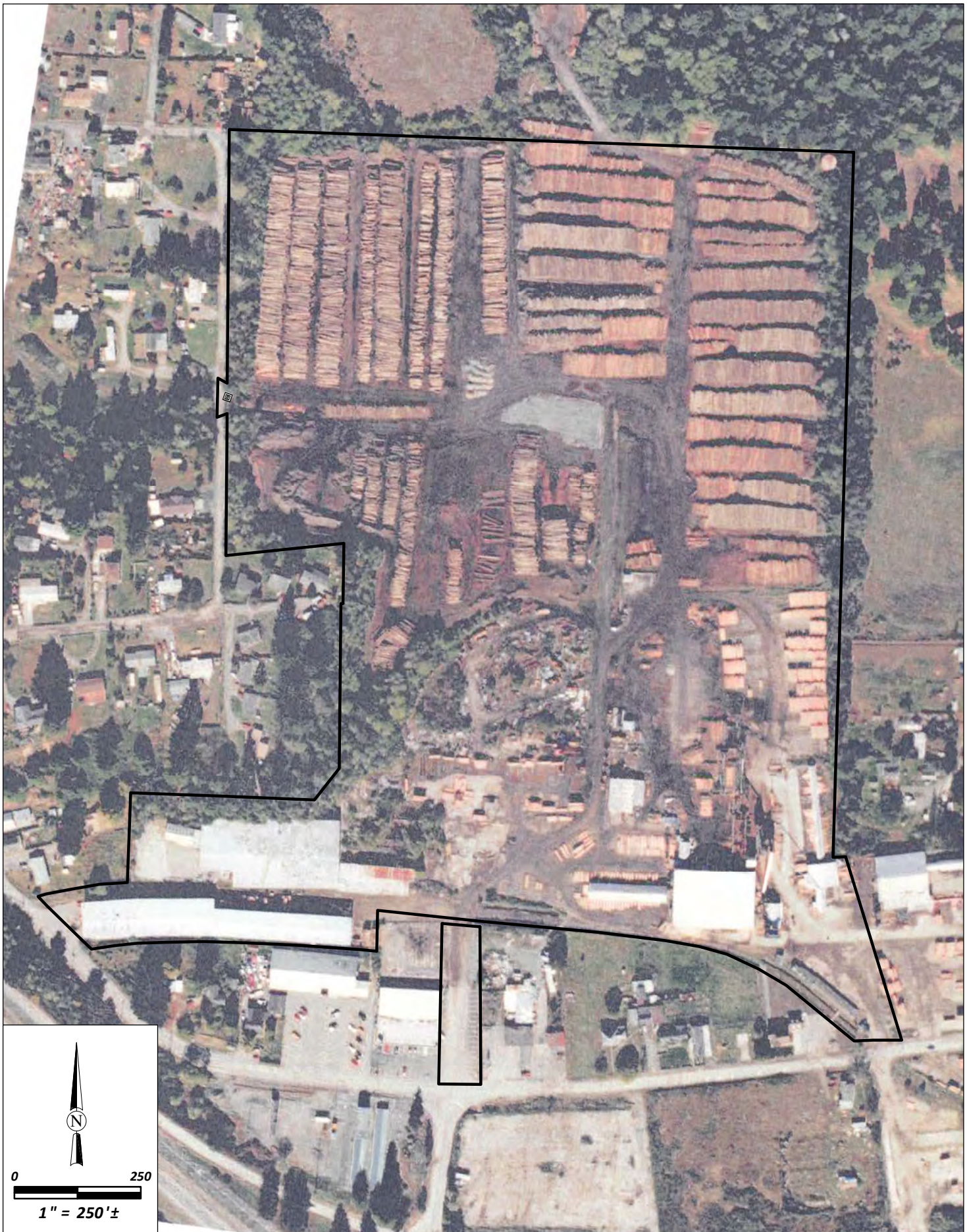
Royal Gold
Updated Biological Report
Glendale Drive, Humboldt County, California

Study Area and Special-status Species Observations
SHN 016098

June 2021 | BIO2_Fig2_StudyArea | Figure 2



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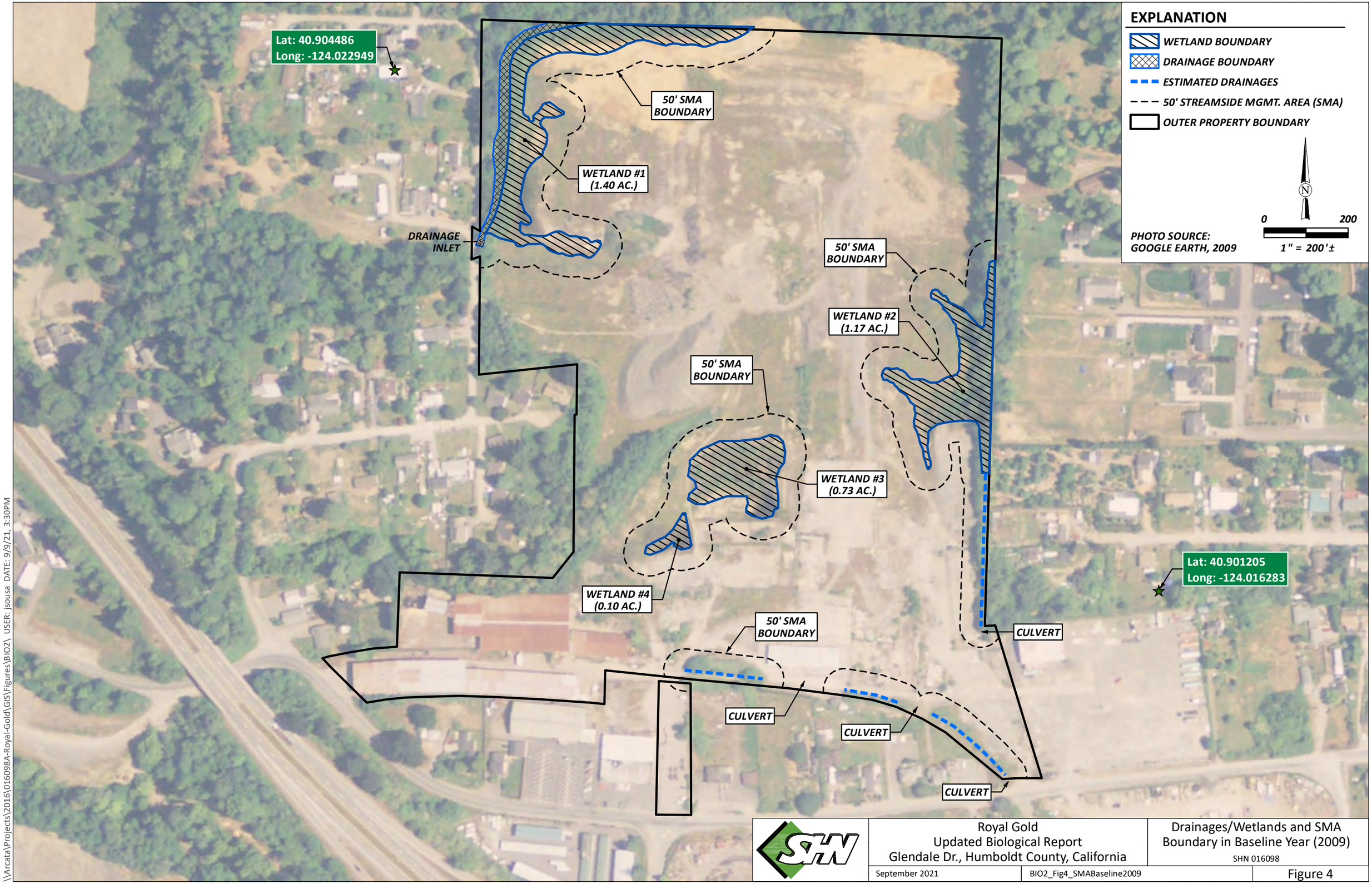
SHN	Royal Gold Updated Biological Report Glendale Dr., Humboldt County, California	Blue Lake Forest Products Historic Aerial Photo (unknown date) SHN 016098
	September 2021 | BIO2_Fig3_BLFPHistoricAerial	Figure 3

stormwater management features, fencing, and utility infrastructure. The majority of the improvements on the site in 2009 were in the southern portion of the site. The northern portion of the site contained compacted gravel surfaces and graded and compacted soils that were historically used for log storage (see Figure 3–Blue Lake Forest Products Historic Aerial Photo [Unknown Date]). Since no field visits to assess biological resources were conducted at the site until approximately 2014, the discussion below contains assumptions about the resources present at the site in the baseline year of 2009. These assumptions are based on review of aerial photography and the knowledge of site conditions beginning in 2014.

Onsite habitat in 2009 primarily consisted of several intermittent drainages and seasonal wetlands formed atop surfaces compacted by past industrial use of the property. The drainages at the site occurred along the northwestern, eastern, and southeastern portions of the site. The eastern and southeastern drainages were channelized stormwater ditches, lined with red alder (*Alnus rubra*) and arroyo willow (*Salix lasiolepis*). Wetland areas had formed along the eastern boundary adjacent to the intermittent drainage and isolated wetlands had formed in the eastern central and southern central portions of the site. The wetlands at the site are classified by the National Wetland Inventory (NWI) as palustrine emergent, persistent, seasonally flooded (PEM1C). However, the forested wetlands at the site are more accurately classified as palustrine scrub-shrub, broadleaved deciduous, seasonally flooded (PSS1C). Dominant botanical species within the wetland areas included red alder, arroyo willow, pacific willow (*Salix lasiandra* var. *lasiandra*), Himalayan blackberry (*Rubus armeniacus*), California blackberry (*Rubus ursinus*), common rush (*Juncus effusus* ssp. *pacificus*), bur clover (*Medicago polymorpha*), velvet grass (*Holcus lanatus*), tall fescue (*Festuca arundinacea*), and creeping buttercup (*Ranunculus repens*). The drainage in the northwestern portion of the site contained a more mature riparian canopy that was lined with seasonal wetlands on its southern boundary.

Figure 4 shows the streamside management area (SMA) boundaries required by the Humboldt County Code (Section 314-61.1) that are estimated to have applied in 2009 when Royal Gold moved to the site. Due to the existing improvements and disturbed condition of the site from past industrial activity (see Figure 3- Blue Lake Forest Products Historic Aerial Photo (Unknown Date)), the SMA boundaries surrounding the drainages and wetlands contained limited habitat value in 2009. Much of the SMA boundaries contained pavement, stormwater improvements, compacted gravel surfaces, graded and compacted soils, or non-native, invasive vegetation. Due to several downstream barriers (for example, culverts, drainage inlets, etc.), the drainages at the site were not fish-bearing. However, these drainages provided habitat for other aquatic species and flowed to fish-bearing streams, including Hall Creek and the Mad River. These drainages were likely movement corridors for amphibians and small mammals in 2009, as they are today. Herbaceous vegetation has increased within the SMA boundaries in the eastern and northwestern portions of the site since 2009, which now contain more suitable habitat for small animals and some botanical species. However, these areas are still degraded from past industrial use and disturbance with non-native botanical species dominant over compacted soils.

Since moving to the site in 2009, Royal Gold has constructed several improvements to accommodate the needs of their business including, but not limited to, additional paving, two new buildings (arch-truss design consisting of steel tube trusses and polyethylene fabric covers), stormwater features (for example, detention basins, bioswales, etc.), security fencing, utility infrastructure, and the construction of earthen berms with imported fill and aggregate material (see Figure 5-Site Plan). Improvements to the site have included the conversion of the wetlands in the southern central portion of the site to stormwater detention basins and the filling of some of these wetlands for use as paving, parking,



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SHN	Royal Gold Updated Biological Report Glendale Dr., Humboldt County, California	Drainages/Wetlands and SMA Boundary in Baseline Year (2009) SHN 016098
	September 2021 | BIO2_Fig4_SMABaseline2009	Figure 4

EXPLANATION

- FACILITY BOUNDARY
- NO GROUND DISTURBANCE AREA
- CONCRETE CAP AREA
- BERM
- PROPOSED PAVING
- PROPERTYLINESPOINTSWESTAPPROXFIG3
- BUILDINGS - EXISTING
- BUILDINGS - PROPOSED
- <E> EXISTING WATER TANKS
- <P> PROPOSED

0 80

1" = 80'±

PROPOSED WETLAND MITIGATION AREA

<P> STORMWATER SWALE

FACILITY BOUNDARY

BERM

SCREEN TAILINGS PILE

BERM

ONE 4.5K GAL. TANK
FIVE 3K GAL. TANKS

EQUIPMENT WASH STATION

DETENTION BASIN

DETENTION BASIN

BERM

SAWDUST STORAGE

FOREST HUMUS STORAGE

DETENTION BASIN

BERM (TO BE REMOVED)

<P> BERM

<P> BUILDING D
300' X 100'
(30,000 SF)

STORMWATER BIOSWALE

<P> DETENTION BASIN

SCREENER

RETAINING WALL

WATER TRUCK FILLING STATION

DETENTION BASIN

DETENTION BASIN

NATIVE PLANTINGS

5K GAL. TANKS

<E> CHIP PIT
42' X 25'
(1,050 SF)

4.5K GAL. TANKS

DETENTION BASIN

<P> CHIP PIT
42' X 25'
(1,050 SF)

CONCRETE BLOCK WALL

<E> BUILDING A
120' X 65' (7,800 SF)
RAW MATERIAL PROCESSING & STORAGE

BULK SOIL BINS

<P> BUILDING E
250' X 170'
(42,500 SF)

BULK SOIL YARD

CONCRETE BLOCK WALL

VISITOR PARKING
(7 SPACES)

PARKING
(36 SPACES)

<P> BUILDING C
200' X 70' (14,000 SF)

RAW MATERIALS STORAGE

ACCESS RAMP

2.5K GAL. TANK

PARKING
(3 ADA SPACES)

R & D GREENHOUSE

CROWN JEWELS PRODUCTION LINE

MAIN BAGGING LINE

OFFICE

<E> BLDG B
73' X 60'
(4,380 SF)

PALLET STORAGE

FINISHED COCO STORAGE

FINISHED RAW MATERIALS

PERLITE

PALLET WRAPPERS

DETENTION BASIN

CONCRETE CAP

ENCLOSED COMPOST STORAGE

CONCRETE CAP

NO GROUND DISTURBANCE

EXIT

PARKING
(7 SPACES)

MAINTENANCE/ FABRICATION

GRINDER / HYDRATION AREA
<E>

4.1K GAL. TANKS

AUTOMATED BAGGING LINE

<P> BUILDING F
40' X 50'
(2,000 SF)

PARKING
(8 SPACES)

PARKING
(12 SPACES)

ENTRANCE / EXIT

EXIT

GLENDALE DR. (CO. RD. #4L765)

HIGHWAY 299

PHOTO SOURCE:
GOOGLE EARTH, 4/2019

Royal Gold
Updated Biological Report
Glendale Dr., Humboldt County, California

Site Plan

SHN 016098

September 2021 | BIO2_Fig5_SitePlan | Figure 5

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storage, and coco processing (see Figure 4-Drainages/Wetlands and SMA Boundary in Baseline year (2009) and Figure 6-Site Plan with Baseline Year (2009) Streamside Management Areas. Several improvements constructed by Royal Gold also encroach into the SMA boundaries that are estimated to have been applicable in 2009. As indicated in Figure 6 (Site Plan with Baseline Year (2009) Streamside Management Areas), the encroaching improvements include a new building, paving, earthen berms, water tanks, parking, stormwater management features, a coco processing area, and storage areas. Photos of the stormwater detention basins in the central portion of the property are included in Appendix 4 (see Photos 1, 2, and 3). The stormwater management features at the site are illustrated and shown in Appendix 5 (Stormwater Pollution Prevention Plan [SWPPP] Best Management Practice [BMP] Location Map) and Appendix 4 (see Photos 4 and 5).

2.0 Methods

2.1 Review of Existing Data

This Updated Biological Report includes a review of current existing data and information related to special-status species of plants, animals, and sensitive natural communities that may be present at the site containing the Royal Gold facility.

Wildlife habitat survey and observations were conducted in 2021 by an SHN senior biologist with twenty-two years of experience. Botanical surveys and observations were conducted by an SHN senior botanist in 2017 and 2021 with 8 years of protocol botanical survey experience.

The findings of this report are the result of several sources, including a review of existing literature regarding sensitive biological resources that have the potential to occur within the study area. The study area was defined as the area of potential project activities (see Figure 2). Biological scoping included a review of the following sources:

- California Natural Diversity Database (CNDDB) query for Arcata North and surrounding United States Geological Survey (USGS) 7.5-minute topographic quadrangles (Crannell, Panther Creek, Blue Lake, Korbel, Arcata South, Eureka, Tyee City, and Trinidad) (California Department of Fish and Wildlife [CDFW], 2021a).
- Biogeographical Information and Observation System's Rarefind[1] database (BIOS; CDFW, 2021b).
- Electronic Inventory of Rare and Endangered Vascular Plants of California (California Native Plant Society [CNPS], 2021) query for a list of all botanical species reported for project area, and surrounding USGS 7.5-minute topographic quadrangles.
- Special Animals of California List (CDFW, 2020).
- United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) was queried for threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of, and/or may be affected by, the proposed project (USFWS, 2021a).
- USFWS Threatened and Endangered Species Active Critical Habitat Report Geographic Information System (GIS) database (USFWS, 2021b).

[1] Rarefind is a "positive detection" database. The absence of data does not imply absence of special status species.

EXPLANATION

- BASELINE YEAR SMA (2009)
- WATER TANKS
- DRAINAGE SWALE
- BERM
- BUILDINGS - EXISTING
- BUILDINGS - PROPOSED
- CONCRETE CAP AREA
- NO GROUND DISTURBANCE AREA
- PROPOSED PAVING
- FACILITY BOUNDARY
- SMA ENCROACHMENT NOTES

PHOTO SOURCE: GOOGLE EARTH, 4/30/2019

0 200

1" = 200'±

PROPOSED WETLAND MITIGATION AREA

BERM

CONSTRUCTION OF EARTHEN BERMS, PAVING, AND STORMWATER FEATURES

EQUIPMENT WASH STATION

BERM

SAWDUST STORAGE

NEW PAVING

SCREENER

WETLAND AREA CONVERTED TO STORMWATER DETENTION BASINS

<P> COCO PROCESSING AREA

WETLAND FILLED AND DEVELOPED AS PARKING, STORAGE, PAVING, AND COCO PROCESSING AREA

DETENTION BASIN

DETENTION BASIN

DETENTION BASIN

DETENTION BASIN

BIOSWALE

<P> BLDG.

<P> BLDG.

NEW BLDG.

<P> BLDG.

BERM (TO BE REMOVED)

STORMWATER SWALE

BERM

FACILITY BOUNDARY

OUTER PROPERTY BOUNDARY

PROPOSED EARTHEN BERM AND STORMWATER SWALE

CONSTRUCTION OF EARTHEN BERM (TO BE REMOVED)

PROPOSED CONVERSION OF WETLAND AREA TO A STORMWATER DETENTION BASIN

STORAGE AREA

<P> PAVING

STORAGE AREA

CONSTRUCTION OF LINED STORMWATER SWALE

DETENTION BASIN

CONC. CAP

ENCLOSED COMPOST STORAGE

CONC. CAP

NO GROUND DISTUR-BANCE

STORAGE AREA

STORMWATER FEATURE

STORAGE AREA

GLENDALE DR.

\\Arcata\Projects\2016\016098A-Royal-Gold\GIS\Figures\BIO2\ USER: jsousa DATE: 9/10/21, 11:19AM

SHN	Royal Gold Updated Biological Report Glendale Dr., Humboldt, California	Site Plan with Baseline Year (2009) Streamside Management Areas SHN 016098
	September 2021 | BIO2_Fig6_SMA2009wSitePlan	Figure 6

From the sources listed above, lists of target special-status botanical and animal species potentially occurring within the study area were compiled. Appendices 6 and 7 include botanical and animal species, respectively, reported by the CNDDB and USFWS, and species listed in the CNPS inventory of rare plants. The USFWS IPaC query results are presented in Appendix 8.

2.2 Coordination with Permitting and Regulatory Agencies

An after-the-fact Special Permit is required from the County of Humboldt for improvements that Royal Gold has constructed within SMAs since they moved to the site in 2009. A Special Permit is also required for some of the improvements that Royal Gold is proposing as part of the full buildout of their facility that will encroach into SMAs. As indicated in Figure 6 (Site Plan with Baseline Year (2009) Streamside Management Areas), the encroaching improvements (existing and proposed) include new buildings, paving, earthen berms, water tanks, parking, stormwater management features, a coco processing area, and storage areas. The improvements to the site have included the conversion of the wetlands in the southern central portion of the site to stormwater detention basins and the filling of some of these wetlands for use as paving, parking, storage, and coco processing (see Figure 4-Drainages/Wetlands and SMA Boundary in Baseline year (2009) and Figure 6-Site Plan with Baseline Year (2009) Streamside Management Areas).

As required, Royal Gold is coordinating with applicable state and federal agencies (for example, United States Army Corps of Engineers (USACE), North Coast Regional Water Quality Control Board (RWQCB), and CDFW) to obtain permits for some of these activities. This has included site visits and pre-consultation for preparation of an Initial Study pursuant to CEQA.

2.3 Field Observations and Studies

For the 2017 Biological Survey Report, site visits were conducted on January 17, 24, and 25, and July 27, 2017, for an assessment of the habitat, botanical and animal species present, vegetation communities found within the project area, and the potential for the occurrence of any listed botanical or animal species, or associated habitat. The 2017 surveys included a botanical survey within the late season blooming period (see Appendix 1). For this Updated Biological Report, a total of twelve staff hours of field observations were made within the study area (Figure 2) on January 20 and April 14 and 27, 2021. This involved surveys for botanical and animal species, including a botanical survey during the early season blooming period.

The CNDDB, CNPS, and IPaC databases were queried for updates to the previously prepared 2017 scoping lists prior to conducting the 2021 site visits (see Appendices 6-8). Lists of all botanical and animal species observed while conducting the 2021 field visits are presented in Appendices 9 and 10, respectively. Nomenclature for special-status animals conforms to the CDFW Special Animals List (CDFW, 2020). Habitat assessments were also conducted for special-status botanical and animal species during the 2021 site visits. Site Photographs from the site visits are included in Appendix 4.

3.0 Environmental Setting

The project site is situated at an average 110-foot elevation above mean sea level in northern Humboldt County. The region experiences a Mediterranean climate with warm, dry summers and cool, wet

winters. The bulk of annual precipitation occurs in the fall, winter, and spring (December averages 8.12 inches). Summers are typically dry (August averages 0.31 inches). The annual average precipitation is 40.53 inches.

3.1 Geologic and Soil Composition

The project site is on the south-facing aspect of the Mad River drainage. The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS; USDA-NRCS, 2021) Web Soil Survey classifies the soils at the project site as Timmons and Lepoil soils, 0 to 2 percent slopes; Lepoil-Candymountain complex, 2 to 15 percent slopes; and Lepoil-Espa-Candymountain complex, 15 to 50 percent slopes, all of which are considered well drained. As the site was historically used as a lumber mill and log decks, native soils had been graded, covered with fill, and/or paved prior to the current occupancy of the site by Royal Gold (see Figure 3-Blue Lake Forest Products Historic Aerial Photo (Unknown Date)).

3.2 Vegetation

Vegetation has not changed significantly since the 2017 Biological Survey Report. As noted in that report, vegetation is limited across the site, with many areas not supporting vegetation due to compacted gravel surfaces and regular vehicle traffic. Less disturbed areas supported non-native grasslands dominated by tall fescue, velvet grass, sweet vernal grass (*Anthoxanthum odoratum*), hairy cats-ear (*Hypochaeris radicata*), and in some places, toad rush (*Juncus bufonius* var. *bufonius*). The edges of the project area support a developing canopy of red alder, arroyo willow, and young conifers such as Sitka spruce (*Picea sitchensis*) and Douglas fir (*Pseudotsuga menziesii*). Areas with developing red alder canopy cover may represent a transition to red alder forest alliance within the wetter portions of the project area. Red alder forest has a rarity ranking of G5S4 meaning it is secure globally, and presumably secure within the state of California. The areas within the project area supporting red alder saplings are not high-quality examples of this vegetation community, but rather represent a transition from maintained drainage ditches to more natural botanical communities (Appendix 4, Photo 6). Numerous vegetation communities surround the project site, including upland conifer forests to the north of the project, and riparian woodlands along the Mad River and larger tributaries such as Hall Creek to the southeast of the project.

3.3 Wildlife Habitats

Due to the disturbed condition of the site from past industrial uses (see Figure 3-Blue Lake Forest Products Historic Aerial Photo (Unknown Date)), there is limited wildlife habitat throughout the majority of the site. As indicated on Figure 4 (Drainages/Wetlands and SMA Boundary in Baseline Year (2009)), onsite wildlife habitat primarily consists of several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site and seasonal wetlands that occur within the northwestern and central portions of the site. As discussed above, the wetlands in the central southern portion of the site were converted to stormwater detention basins or filled for use as paving, parking, storage, and coco processing (see Figure 6-Site Plan with Baseline Year (2009) Streamside Management Area and Appendix 3). The intermittent drainages and seasonal wetlands at the site provide potential habitat for a variety of wildlife. In addition, isolated pools of seasonal water in the undeveloped grassland areas in the northern portion of the site provide temporary amphibian breeding habitat (see Appendix 4, Photo 7). Some of the stormwater management features at the site also may

provide temporary habitat for wildlife, including aquatic species (see Appendix 4, Photos 1, 2, 3, and 4). The riparian corridor and wetland complex in the northwest portion of the site provides the highest quality habitat for wildlife breeding, foraging, and movement (see Appendix 4, Photo 8).

Common wildlife species expected within the project site are those typically associated with urban areas, grasslands, riparian areas, and freshwater marshes of northwestern California. Animal species observed during fieldwork are presented in Appendix 10. Other wildlife species are likely to inhabit the surrounding area and it is expected that there are many other bird, mammal, and amphibian species that might use the study area on a temporal scale.

Wildlife movement includes migration (usually one-way per season), inter-population movement (long-term genetic flow), and small travel pathways (daily movement corridors within an animal's territory). Although small travel pathways usually facilitate movement for daily home range activities, such as foraging or escape from predators, they also provide connection between outlying populations and the main corridor, permitting an increase in gene flow among populations (Whitaker, 1998). It is expected that vegetated areas along the perimeter of the project site are used as small travel pathways for a number of species between upland forested habitat and riparian habitat along Hall Creek and the Mad River.

3.4 Offsite Conditions

Surrounding land uses and habitat conditions are as follows (see Figure 2-Study Area):

- To the North: Mixed conifer and hardwood forest, grassland, and rural residential development.
- To the West: Rural residential development.
- To the East: Rural residential development, industrial/commercial development, and intermittent drainages.
- To the South: Commercial, residential, and industrial development, Glendale Drive, Highway 299, and the Hall Creek riparian corridor.

4.0 Regulatory Setting

Regulatory authority over biological resources is shared by federal, State, and local authorities under a variety of legislative acts. The following section summarizes the federal, State, and local regulations for special-status species, jurisdictional waters of the U.S. and State of California, and other sensitive biological resources. This section provides a listing and overview of these federal, State, and local laws.

4.1 Federal Laws

4.1.1 Clean Water Act Sections 404 and 401

Under Section 404 (33 U.S. Code (USC) 1341) of the Clean Water Act (CWA), as amended, the USACE retains primary responsibility for permits to discharge dredged or fill material into waters of the U.S. All discharges of dredged or fill material into jurisdictional waters of the U.S. that result in permanent or temporary losses of waters of the U.S. are regulated by the USACE (U.S. Environmental Protection Agency [EPA], 2002). A permit from the USACE must be obtained before placing fill or grading in wetlands or other waters of the U.S., unless the activity is exempt from CWA Section 404 regulation (for example, certain farming and forestry activities).

The USACE defines wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Environmental Laboratory, 1987). In other words, the USACE defines wetlands by the presence of all three wetland indicators: hydrophytic vegetation, hydric soils, and wetland hydrology.

Waters of the U.S. are defined in 33 Code of Federal Regulations (CFR) Part 328. They include traditional navigable waters; relatively permanent, non-navigable tributaries of traditional navigable waters; and certain wetlands. Following recent court cases, the EPA and USACE published a memorandum entitled "Clean Water Act Jurisdiction" (EPA/USACE, 2008) to guide the determination of jurisdiction over waters of the U.S., especially for wetlands. The applicability of Section 404 permitting over discharges to wetlands is, therefore, a two-step process: 1) determining the areas that are wetlands, and 2) where a wetland is present, assessing the wetland's connection to traditional navigable waters and non-navigable tributaries to determine whether the wetland is jurisdictional under the CWA. A wetland is considered jurisdictional if it meets certain specified criteria.

The USACE is required to consult with the USFWS and/or National Marine Fisheries Service (NMFS) under Section 7 of the Federal Endangered Species Act (FESA) if the action subject to CWA permitting could result in "Take" of federally listed species or an adverse effect to designated critical habitat. The project is within the jurisdiction of the San Francisco District of the USACE.

Section 401 of the CWA (33 USC 1341; EPA, 1977) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the U.S. to obtain a certification from the state in which the discharge originates or would originate, or if appropriate, from the interstate water pollution control agency having jurisdiction over the affected waters at the point where the discharge originates or would originate, that the discharge will comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility. The responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and its nine RWQCBs. The project is within the jurisdiction of the North Coast RWQCB.

4.1.2 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 USC Sections 661-667e, as amended, 1958, 1978, 1994, and 1995) requires that whenever waters, the channel of a stream, or other body of water are proposed or authorized to be modified by a public or private agency under a federal license or permit, the federal agency must first consult with the USFWS and/or NMFS and with the head of the agency exercising administration over the wildlife resources of the state where construction will occur (in this case, the CDFW). These guidelines aim at conservation of birds, fish, mammals, and all other classes of wild animals, and all types of aquatic and land vegetation upon which wildlife is dependent (USFWS, 1934).

If direct permanent impacts occur to waters of the U.S. from a proposed project, then a permit from USACE under CWA Section 404 is required for the construction of the proposed project. USACE is required to consult with USFWS and/or NMFS as appropriate regarding potential impacts to federally listed species under FESA. Such action may prompt consultation with CDFW, which would review the project pursuant to California Endangered Species Act (CESA) and issue a consistency letter with USFWS and/or NMFS, if required.

4.1.3 Federal Endangered Species Act

The United States Congress passed the FESA in 1973 to protect species that are endangered or threatened with extinction (USFWS, 1973). The FESA is intended to operate in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend and within which they live. The USFWS and the NMFS are the designated federal agencies responsible for administering the FESA.

The FESA prohibits the "Take" of endangered or threatened wildlife species. A "Take" is defined as harassing, harming (including significantly modifying or degrading habitat), pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species, or any attempt to engage in such conduct (16 USC 1531, 50 CFR 17.3). An activity can be defined as a "Take" even if it is unintentional or accidental. Taking can result in civil or criminal penalties. Activities that could result in "Take" of a federally-listed species require an incidental "Take" authorization resulting from FESA Section 7 consultation or FESA Section 10 consultation. Plants are legally protected under the FESA only if "Take" occurs on federal land or from federal actions, such as, issuing a wetland fill permit.

A federal endangered species is one that is considered in danger of becoming extinct throughout all, or a significant portion, of its range. A federal threatened species is one that is likely to become endangered in the foreseeable future. The USFWS also maintains a list of species proposed for listing as threatened or endangered. Proposed species are those for which a proposed rule to list as endangered or threatened has been published in the Federal Register. In addition to endangered, threatened, and proposed species, the USFWS maintains a list of candidate species. Candidate species are those for which the USFWS has on file sufficient information to support issuance of a proposed listing rule.

Pursuant to the requirements of the FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally-listed endangered or threatened species may be present in the project area, and determine whether the proposed project will have a potentially significant impact on such a species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the FESA or result in the destruction or adverse modification of critical habitat designated or proposed to be designated for such species (16 USC 1536[3], [4]). Project-related impacts to species on the FESA endangered or threatened list would be considered significant, and would require mitigation.

4.1.4 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21; USFWS, 1918). The MBTA also prohibits disturbance and harassment of nesting migratory birds at any time during their breeding season. The USFWS is responsible for enforcing the MBTA (16 USC 703). The migratory bird nesting season is generally considered to be between March 15 and August 31 within the project area.

4.2 State Laws

4.2.1 Porter-Cologne Water Quality Control Act

The state and RWQCB also maintain independent regulatory authority over the placement of waste, including fill, into waters of the state under the Porter-Cologne Water Quality Control Act (SWRCB, 1969).

Waters of the state are defined by the Porter-Cologne Water Quality Control Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The SWRCB protects all waters in its regulatory scope, but has special responsibility for isolated wetlands and headwaters. These water bodies might not be regulated by other programs, such as, Section 404 of the CWA. Waters of the state are regulated by the RWQCBs under the State Water Quality Certification Program, which regulates discharges of dredged and fill material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act. Projects that require an USACE permit, or fall under other federal jurisdiction, and have the potential to impact waters of the state are required to comply with the terms of the Water Quality Certification Program. If a proposed project does not require a federal license or permit, but does involve activities that may result in a discharge of harmful substances to waters of the state, the RWQCBs have the option to regulate such activities under their state authority in the form of Waste Discharge Requirements (WDRs) or certification of WDRs.

4.2.2 California Endangered Species Act

The State of California enacted the CESA in 1984 (CDFW, 1984). The CESA is similar to the FESA, but pertains to state-listed endangered and threatened species. Under the CESA, the CDFW has the responsibility for maintaining a list of threatened and endangered species designated under state law (California Fish and Game Code [CFGC] 2070; CDFW, 1998). Section 2080 of the CFGC prohibits "Take" of any species that the commission determines to be an endangered or threatened species. "Take" is defined in Section 86 of the CFGC as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

The state and federal lists of threatened and endangered species are generally similar; however, a species present on one list may be absent from the other. CESA regulations are also somewhat different from the FESA in that the California regulations include threatened, endangered, and candidate plants on non-federal lands within the definition of "Take." CESA allows for "Take" incidental to otherwise lawful development projects.

Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. Project-related impacts to species on the CESA endangered or threatened list (or, in addition, designated by the CDFW as a Species of Special Concern [SSC], which is a level below threatened or endangered status) would be considered significant and would require mitigation.

4.2.3 Native Plant Protection Act

The Native Plant Protection Act (NPPA; Sec. 1900-1913 of the CFGC) was enacted in 1977 and allows the Fish and Game Commission to designate plants as rare or endangered. The NPPA precedes the CESA. Statewide, there are 64 species, subspecies, and varieties of plants that are protected as rare under the NPPA. The NPPA prohibits take of endangered or rare native plants, but includes some exceptions for agricultural and nursery operations, emergencies, and after properly notifying CDFW for vegetation removal from canals, roads, and other sites, changes in land use, and in certain other situations. Plants listed as rare or endangered under the NPPA should be considered during project review as if they were listed under the CESA.

4.2.4 California Environmental Quality Act

CEQA Guidelines Sections 15125(c) and 15380(d) provide that a species not listed on the federal or State list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria (CNRA, 1970). Thus, CEQA provides the ability to protect a species from potential project impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

CNPS maintains an inventory of botanical species native to California, with populations that are significantly reduced from historical levels, occur in limited distribution, or otherwise are rare or threatened with extinction. This information is published in the Inventory of Rare and Endangered Plants of California (CNPS, 2021). Taxa with a California Rare Plant Rank (CRPR) of 1A, 1B, 2A, 2B, and 3 in the CNPS inventory consist of plants that are eligible for state listing, and meet the definition of Rare or Endangered under CEQA Guidelines Sections 15125(c) and 15380(d). CRPR 4 populations may qualify for consideration under CEQA if they are peripheral or disjunct populations, represent the type locality of the species, or exhibit unusual morphology and/or occur on unusual substrates.

Additionally, CDFW maintains lists of special-status animals and plants. These lists include a species conservation ranking status from multiple sources, including FESA, CESA, federal departments with unique jurisdictions, CNPS, and other non-governmental organizations. Based on these sources, CDFW assigns a heritage rank to each species according to their degree of imperilment (as measured by rarity, trends, and threats). These ranks follow NatureServe's Heritage Methodology, in which all species are listed with a G (global) and S (state) rank. Species with state ranks of S1-S3 are also considered highly imperiled.

CEQA Guidelines checklist IV(b) calls for the consideration of riparian habitats and sensitive natural communities. Sensitive vegetation communities are natural communities and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. However, these communities may or may not necessarily contain special-status species. Sensitive natural communities are usually identified in local or regional plans, policies, or regulations, or by the CDFW (that is, the CNDDB and Vegetation Classification and mapping Program [VegCAMP]) or the USFWS. Impacts to sensitive natural communities and habitats must be considered and evaluated under CEQA (California Code of Regulations [CCR]: Title 14, Div. 6, Chap. 3).

Although sensitive natural communities do not (at present) have legal protection, CEQA calls for an assessment of whether any such resources would be affected, and requires a finding of significance if there will be substantial losses. High-quality occurrences of natural communities with heritage ranks of 3 or lower are considered by CDFW to be significant resources and fall under the CEQA guidelines for addressing impacts. Local planning documents (such as general plans) often identify these resources as well. Avoidance, minimizations, or mitigation measures should be implemented if project-affected stands of rare vegetation types or natural communities are considered high-quality occurrences of the given community.

As a trustee agency under CEQA, CDFW reviews potential project impacts to biological resources, including wetlands. In accordance with the CEQA thresholds of significance for biological resources, areas that meet the state criteria for wetlands and could be impacted by a project must be analyzed.

Pursuant to CFGC Section 2785, CDFW defines wet areas as "lands which may be covered periodically or permanently with shallow water and which include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, fens, and vernal pools."

4.2.5 California Fish and Game Code Section 1600

Streams, lakes, and riparian vegetation as habitat for fish and other wildlife species, are subject to jurisdiction by the CDFW under Sections 1600-1616 of the CFGC (CDFW, 2021c). Any activity that will do one or more of the following generally require a Lake and Streambed Alteration (LSA) Agreement:

1) Substantially obstruct or divert the natural flow of a river, stream, or lake
2) Substantially change or use any material from the bed, channel, or bank of a river, stream, or lake
3) Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

The term "stream," which includes creeks and rivers, is defined in the CCR as, "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life." This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation (14 CCR 1.72; CNRA, 1987).

In addition, the term "stream" can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. Riparian is defined as "on, or pertaining to, the banks of a stream"; therefore, riparian vegetation is defined as vegetation that occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself. Removal of riparian vegetation also requires an LSA agreement from CDFW.

4.2.6 California Fish and Game Code Sections 3503 and 3513

According to Section 3503 of the CFGC, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (except English sparrows [*Passer domesticus*] and European starlings [*Sturnus vulgaris*]). Section 3503.5 specifically protects birds in the orders Falconiformes and Strigiformes (birds-of-prey). Section 3513 essentially overlaps with the MBTA, prohibiting the "Take" or possession of any migratory non-game bird. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "Take" by the CDFW.

4.2.7 Fully Protected Species and Species of Special Concern

The classification of "fully protected" was the CDFW's initial effort to identify and provide additional protection to those animals that were rare or faced with possible extinction. Lists were created for fishes, amphibians, reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. The CFGC sections (fish at Sec. 5515, amphibians and reptiles at Sec. 5050, birds at Sec. 3511, and mammals at Sec. 4700) dealing with "fully protected" species state that these species "…may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species," (CDFW, 1998) although "Take" may be authorized for necessary scientific research. This

language makes the "fully protected" designation the strongest and most restrictive regarding the "Take" of these species. In 2003, the code sections dealing with fully protected species were amended to allow the CDFW to authorize "Take" resulting from recovery activities for state-listed species.

SSCs are broadly defined as animals not listed under the CESA, but that are nonetheless of concern to the CDFW because they are declining at a rate that could result in listing or historically occurred in low numbers with known threats to their persistence currently existing. This designation is intended to result in special consideration for these animals by the CDFW, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under CESA and cumbersome recovery efforts that might ultimately be required. This designation also is intended to stimulate collection of additional information on the biology, distribution, and status of poorly known at-risk species, and focus research and management attention on them. Although the SSC designation provides no special legal status, they are given special consideration under CEQA during project review.

4.2.8 Natural Community Conservation Planning Act

The Natural Community Conservation Planning (NCCP) Act of 1991 is an effort by the State of California and numerous private and public partners that is broader in its orientation and objectives than the CESA and FESA (refer to discussions above). The primary objective of the NCCP Act is to conserve natural communities at the ecosystem scale while accommodating compatible land uses (CDFW, 1991). The NCCP Act seeks to anticipate and prevent the controversies and gridlock caused by species listings by focusing on the long-term stability of wildlife and botanical communities and including key interests in the process. No regionally-occurring natural community or associated plan is listed by the state for the project area.

4.3 Other Statutes, Codes, and Policies

4.3.1 Humboldt County General Plan

An update of the Humboldt County General Plan was adopted October 23, 2017. Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan includes policies regarding the protection of critical habitats, sensitive habitats, SMAs, wetlands, oak woodlands, and invasive species. Critical habitats are habitats necessary for the protection of threatened or endangered species listed under the FESA. In addition to species and communities identified by the USFWS and CDFW, migratory deer winter ranges, Roosevelt elk ranges, avian rookery/nesting sites, streams and streamside areas, and wetland areas are defined as sensitive habitats (County of Humboldt, 2017).

Standard BR-S5 in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan provides a definition of SMAs, which include a natural resource area along both sides of streams containing the channel and adjacent land. SMAs do not include watercourses consisting entirely of a manmade drainage ditch, or other man-made drainage device, construction, or system (County of Humboldt, 2017).

SMAs are areas specifically mapped as SMA and Wetland (WR) Combining Zones, subject to verification and adjustment pursuant to site-specific biological reporting and review procedures. For areas along streams not specifically mapped as SMA and WR Combining Zones, the outer boundaries of the SMA shall be defined as:

1. 100 feet, measured as the horizontal distance from the top of bank or edge of riparian drip-line whichever is greater on either side of perennial streams.
2. 50 feet, measured as the horizontal distance from the top of bank or edge of riparian drip-line whichever is greater on either side of intermittent streams.
3. The width of SMAs shall not exceed 200 feet measured as a horizontal distance from the top of bank.

SMAs may be reduced or eliminated where the County determines, based on specific factual findings, that the mapping of the SMA is not accurate, there are no in-channel wetland characteristics or off-channel riparian vegetation, the reduction will not significantly affect the biological resources of the SMA on the property. When the prescribed buffer would prohibit development of the site for the principal use for which it is designated, measures shall be applied that result in the least environmentally damaging feasible project (County of Humboldt, 2017).

Standard BR-S11 in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan provides a definition of wetlands, which states the following:

> "The County shall follow the US Army Corps of Engineers Wetland Delineation manual in the identification and classification of wetlands which considers wetlands as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." (County of Humboldt, 2017).

Standard BR-S10 in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan provides the development standards for wetlands. Setbacks for wetlands begin at the edge of the delineated wetland and the widths of the SMA for wetlands is 50 feet for seasonal wetlands and 150 for perennial wetlands. Buffers may be reduced based on site specific information and consultation with the California Department of Fish and Wildlife. No buffer shall be required for man-made wetlands except wetlands created for mitigation purposes.

4.3.2 Humboldt County Code Section 314-61.1

Humboldt County Code Section 314-61.1 (Streamside Management Areas and Wetlands Ordinance [SMAWO]) implements the goals, policies, and standards for SMAs, wetlands, and other wet areas contained in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of the County General Plan. All development within or affecting SMAs, wetlands, or other wet areas not exempted under County Code Section 314-61.1.4, requires a Special Permit from the County. Section 61.1.4.1 exempts routine maintenance activities from the requirement to obtain a Special Permit, which are defined as "*activities to support, keep and continue in an existing state or condition without decline*." Routine maintenance activities include the replacement of culverts and related structures when conducted pursuant to a Department of Fish and Wildlife LSA Agreement.

5.0 Results

From the review of existing species data (see Section 2.0 Methods), lists of special-status botanical and animal species potentially occurring within the project area were compiled. Appendix 6 includes a list of all botanical species reported from the queries, their preferred habitat, and whether there is suitable

habitat present within the project site for the species. Appendix 7 includes a list of all animal species reported from the queries, their preferred habitat, and whether there is suitable habitat present within the project site for the species. The potential of occurrence for those species included on the lists were then evaluated based on the habitat requirements of each species relative to the conditions observed during the field surveys. Each species was evaluated for its potential to occur at the project site according to the following criteria:

- None. Species listed as having "none" are those species for which:
  - there is no suitable habitat present in the study area (that is, habitats in the study area are unsuitable for the species requirements [for example, elevation, hydrology, Botanical community, disturbance regime, etc.]).
- Low. Species listed as having a "low" potential to occur in the study area are those species for which:
  - there is no known record of occurrence in the vicinity, and
  - there is marginal or very limited suitable habitat present within the study area.
- Moderate. Species listed as having a "moderate" potential to occur in the study area are those species for which:
  - there are known records of occurrence in the vicinity, and
  - there is suitable habitat present in the study area.
- High. Species listed as having a "high" potential to occur on the study area are those species for which:
  - there are known records of occurrence in the vicinity (there are many records and/or records in close proximity), and
  - there is highly suitable habitat present in the study area.
- Present. Species listed as "present" in the study area are those species for which:
  - the species was observed in the study area.

The results in this Updated Biological Report represent conditions at the time of fieldwork and are intended to provide current updates to the Biological Survey Report previously prepared for the project site (see Appendix 1). It is possible that some species were not observable at the time of the fieldwork and that conditions have changed since field work was completed. This Report documents the investigation by using the best professional judgment of an SHN senior wildlife biologist and senior botanist.

5.1 Special-status Botanical Species

A total of 72 special-status botanical species have been reported from the region consisting of the project site's quadrangle and surrounding quadrangles. Of the special-status botanical species reported in the region, 66 species have low or no potential to occur and 6 species have a moderate or high potential to occur within the project area (see Appendix 6). Species that have a moderate or high potential to occur within the project site are described below. A protocol-level early season botanical survey was conducted on April 27, 2021 to provide a current plant list for the expanded project area.

Results from this survey were combined with the late-season survey results from the 2017 Biological Survey Report for a comprehensive list of botanical species observed within the study area (see Appendix 9).

Rattan's milk vetch (*Astragalus rattanii* var*. rattanii*) is a perennial herb in the Fabaceae family. Its elevation range is reported as 30-825 meters above sea level. Within its range state-wide, its blooming period is reported as April through July. This species is reported from open grassy hillsides, gravely flats in valley bottoms, and gravel bars of streambeds. Degraded habitat may exist locally for this species; however, it was not observed within the study area during the 2017 or 2021 botanical surveys.

The harlequin lotus (*Hosackia gracilis*) is a perennial herb in the Fabaceae family. Its elevation range is reported as 0-700 meters above sea level. Within its range state-wide, its bloom period is reported as March through July. This species is reported from wetlands and roadsides, specifically marshy and swampy locations. Although habitat may exist locally for this species, it was not observed during the 2017 or 2021 botanical surveys.

Howell's montia (*Montia howellii*) is an annual herb in the Montiaceae family. Its elevation range is reported as 0 to 835 meters above sea level. Within its range state-wide, its blooming period is reported as March through May. This species is reported from vernally mesic meadows and seeps, north coast coniferous forests, and sometimes roadside habitats and other disturbed wet areas. Although habitat may exist locally for this species, it was not observed within the study area during the 2017 or 2021 botanical surveys.

The nodding semaphore grass (*Pleuropogon refractus*) is a perennial grass in the Poaceae family. Its elevation range is reported as 0-1,600 meters above sea level. Within its range state-wide, its blooming period is reported as March through August. This species is reported from mesic sites along streams and in grassy flats in shaded groves. Although habitat may exist locally for this species, it was not observed within the study area during the 2017 or 2021 botanical surveys.

The trailing black currant (*Ribes laxiflorum*) is a perennial shrub in the Grossulariaceae family. Its elevation range is reported as 5-1,395 meters above sea level. Within its range state-wide, its blooming period is reported as March through July. This species is reported from north coast coniferous forests in moist locations. Although habitat may exist locally for this species, it was not observed within the study area during the 2017 or 2021 botanical surveys.

The maple-leaved checkerbloom (*Sidalcea malachroides*) is a perennial herb in the Malvaceae family. Its elevation range is reported from 0 to 730 meters above sea level. Within its range state-wide, its blooming period is reported as April through August. This species is reported from broadleaf upland forests, coastal prairies, coastal scrub, north coast coniferous forests, and riparian woodlands, often in disturbed areas. Although habitat may exist locally for this species, it was not observed within the study area during the 2017 or 2021 botanical l surveys.

5.1.1 Special-status Botanical Species Summary Results

No special-status Botanical species were observed during the 2017 or 2021 botanical surveys. Although habitat for the above described six special-status botanical species does exist within the project area, these species were not observed.

5.2 Special-status Animal Species

A total of 59 special-status animal species have been reported from the region consisting of the project site's quadrangle and surrounding quadrangles. Of the special-status animal species reported in the region, 50 species have low or no potential to occur and 9 species have a moderate or high potential to occur within the project area (Appendix 7). Species with a moderate or high potential for occurrence within the project site are described below. A special-status animal survey and habitat assessment occurred January 20 and April 14, 2021. The animal species observed within the study area during the surveys are listed in Appendix 10.

5.2.1 Amphibians

The northern red-legged frog (*Rana aurora*) is known to inhabit moist forests, woodlands, and streamsides in northwestern California. It is not listed by either FESA or CESA but is listed as a SSC by CDFW and has heritage ranks of G4/S3. Egg masses are typically laid in ponds or pooling water January to March and may take as long as six months to morph into subadult frogs. Northern red-legged frogs are usually found near permanent water, but can be found far from water in damp woods and thick vegetation during the non-breeding season.

The drainages along the edges of the study area, pooling water in the undeveloped portions of the study area, and seasonal stormwater detention basins in the center of the study area represent habitat for the northern red-legged frog and other native amphibians. During the January 2021 survey, northern red-legged frog egg masses were observed within seasonal, isolated pools on the northern portion of the study area (see Figure 2-Study Area and Appendix 4, Photo 9). This area of the site is proposed for wetland creation as mitigation for existing and proposed wetland impacts at the project site. The isolated pools that provide habitat for this species were dry during the April 2021 site visit. Adult northern red-legged frogs were also reported within the project site during the 2017 wetland delineation (SHN, 2018).

Several egg masses of at least three other native amphibian species were observed during field observations in January 2021 (see Appendix 4, Photos 9, 10, and 11). No American bullfrogs (*Lithobates catesbeianus*) were observed during site visits.

5.2.2 Birds

The Cooper's hawk (*Accipiter cooperii*) builds stick platform nests in crotches of riparian deciduous trees and second-growth conifers near streams. Of all the raptors, it is most associated with urbanized landscapes. It is not listed by either FESA or CESA and has heritage ranks of G5/S4. Foraging habitat does exist within and adjacent to the project site for this species, though it was not observed within the study area during the 2021 animal surveys.

The great egret (*Ardea alba*) lives in freshwater, brackish, and marine wetlands. Special status is specific to nesting colonies of this species. During the breeding season they live in colonies in trees or shrubs with other waterbirds. It is not listed by either FESA or CESA and has heritage ranks of G5/S4. Although habitat may exist within portions of the project site for this species, it was not observed within the study area during the 2021 animal surveys.

The great blue heron (*Ardea herodias*) utilizes shallow estuaries and emergent wetlands. It is less common along riverine, rocky marine shores, and pastures, but will search for prey in shallow water and

open fields. Special status is specific to nesting colonies of this species. It nests in colonies in tops of secluded large snags and live trees. It is not listed by either FESA or CESA and has heritage ranks of G5/S4. This species may use portions of the study area for foraging, but no suitable nesting habitat exists within the study area. This species was not observed within the study area during the 2021 animal surveys.

The American peregrine falcon (*Falco peregrinus anatum*) is found within a wide range of habitats. It is most likely to be found near wetlands, lakes, and rivers, but can be found in almost any open habitat. This species nests on rocky outcroppings or ledges in open areas. It is Delisted (D) by both FESA and CESA, has heritage ranks of G4T4/S3S4, and is Fully Protected (FP). Foraging habitat exists within portions of the project site for this species, although no nesting habitat exists. This species was not observed within the study area during the 2021 animal surveys.

The yellow-breasted chat (*Icteria virens*) is found in riparian woodlands, willows, and brushy areas near streams, rivers, and marshes. It nests in low, dense riparian vegetation usually within 10 feet of the ground. It is not listed by CESA or FESA, has heritage ranks of G5/S3 and is considered a SSC by CDFW. Suitable habitat exists within portions of the project site for this species and this species may occur at the site during the breeding season. This species was not observed within the study area during the 2021 animal surveys.

The black-capped chickadee (*Poecile atricapillus*) inhabits riparian woodlands in Del Norte and northern Humboldt Counties. It is mainly found in deciduous tree-types, especially willows and alders, along large or small watercourses. It is not listed under either FESA or CESA but is included on a Watch List (WL) by CDFW and has heritage ranks of G5/S3. Although habitat may exist within the project site for this species, it was not observed within the study area during the 2021 animal surveys.

The yellow warbler (*Setophaga petechia*) occupies riparian woodlands, often found foraging and nesting in willow, alder, and cottonwoods. It is not listed under either FESA or CESA, but is considered a SSC by CDFW and has heritage ranks of G5/S4. Suitable habitat exists within portions of the project site for this species and this species may occur at the site during the breeding season. This species was not observed within the study area during the 2021 animal surveys.

5.2.3 Fish

There are no special-status fish species with a moderate or high potential to occur within the project site due to the lack of stream connectivity and suitable habitat available.

5.2.4 Insects

There are no special-status insect species with a moderate or high potential to occur within the project site due to the lack of suitable habitat available.

5.2.5 Mammals

The hoary bat (*Lasiurus cinereus*) normally roosts alone on trees, hidden in the foliage, but on occasion has been seen in caves with other bats. It prefers woodland, mainly coniferous forests, but hunts over open areas or lakes and sometimes associated with forest edges. It is not listed by either FESA or CESA

and has heritage ranks of G5/S4. Seasonal foraging habitat exists for this species within and adjacent to the project site and potential roosting habitat exists along the edges of the project site. A focused bat survey was not conducted as part of the survey efforts for this Updated Biological Report.

5.2.6 Mollusks

There are no special-status mollusk species with a moderate or high potential to occur within the project site due to the lack of suitable habitat available.

5.2.7 Reptiles

There are no special-status reptile species with a moderate or high potential to occur within the project site due to the lack of suitable undisturbed habitat available.

5.2.8 Special-status Animal Species Summary Results

One special-status animal species was observed within the study area during the 2021 animal surveys, which was the northern red-legged frog. Egg masses were observed in pooling water in the northern portion of the study area, which is proposed for wetland creation as mitigation for existing and proposed wetland impacts at the project site (see Figure 2-Study Area and Appendix 4, Photo 9).

Although not observed during the 2021 animal surveys, there are several bird species that have potential nesting habitat at the project site.

5.3 Special-status Habitats and Natural Communities

5.3.1 Designated Critical Habitat

USFWS's Critical Habitat database was searched for habitat designated as critical for species listed under the FESA, and CDFW's CNDDB BIOS was queried for Designated Critical Habitat for species listed under FESA and CESA. The CDFW database reported that the nearest critical habitat is 0.16 miles away to the south (Hall Creek) and 0.25 miles to the west (Grassy Creek), specifically for the Steelhead (*Oncorhynchus mykiss irideus*).

5.3.2 Vegetation Communities

Sensitive natural communities are habitats that are generally defined by vegetation type and geographical location and are increasingly restricted in abundance and distribution. Recognition of natural communities is an ecosystem-based approach to maintaining biodiversity in California. High-quality occurrences of natural communities with heritage ranks of 3 or lower are considered by CDFW to be significant resources and fall under the CEQA guidelines for addressing impacts. As noted in the 2017 Biological Survey Report (see Appendix 1), the edges of the study area support a developing red alder (*Alnus rubra*) forest alliance within the drainage ditches and wetter portions of the study area. Red alder forest has a rarity ranking of G5S4 meaning, secure globally and presumably secure within the state of California. The portions of the study area supporting red alder saplings are not high-quality examples of this vegetation community, but rather represent a transition from maintained drainage ditches to more natural botanical communities. Several vegetation communities surround the project site including upland mixed conifer forests to the north of the project site and riparian woodlands along the Mad River and its tributaries (for example, Hall Creek) to the southeast of the site.

5.3.3 Wetland and Riparian Habitats

As indicated on Figure 4 (Drainages/Wetlands and SMA Boundary in Baseline Year (2009)), onsite wetland and riparian habitats consist of seasonal wetlands that occur within the northwestern and central portions of the project site and several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site. As discussed above, the wetlands in the central southern portion of the site were converted by Royal Gold to stormwater detention basins or filled for use as paving, parking, storage, and coco processing (see Figure 6-Site Plan with Baseline Year (2009) Streamside Management Area) and Appendix 3; SHN, 2020). The seasonal wetlands and intermittent drainages at the site provide potential habitat for a variety of wildlife including amphibians and nesting birds. In addition, isolated pools of seasonal water in the undeveloped grassland areas in the northern portion of the site provide temporary amphibian breeding habitat (see Appendix 4, Photo 7). Some of the stormwater management features at the site also may provide temporary habitat for wildlife, including aquatic species (see Appendix 4, Photos 1, 2, 3, and 4). The stormwater management features at the site are illustrated in Appendix 5 (SWPPP BMP Location Map). The riparian corridor and wetland complex in the northwest portion of the site provides the highest quality habitat for wildlife breeding, foraging, and movement (see Appendix 4, Photo 8).

5.3.4 Nesting Bird Habitat

All locations with a shrub or tree canopy layer within the project site may provide suitable nesting habitat for a diverse assemblage of migratory birds. The riparian and forested areas along the northern boundary of the site provide adequate nesting opportunity, although other riparian and forested habitats nearby that are not surrounded by development and disturbance, are of higher quality. Most of the project site is open and exposed and does not provide suitable nesting habitat for most bird species.

5.3.5 Wildlife Movement Corridors

Watercourses and their associated riparian zones are the primary wildlife movement corridors in the project area due to their complex structure, providing cover and hiding places from predators, and their connectivity to other adjacent habitats. Additionally, wildlife may use existing roads and trails that provide corridors between patches of vegetation. The riparian, wetland, and forested areas along the perimeters of the site provide adequate wildlife movement corridors between higher quality habitat areas surrounding the site. During the 2021 animal surveys, it was observed that there is a well-established trail on the northern and eastern boundaries of the site with signs of Roosevelt elk (*Cervus canadensis roosevelti*) (scat), racoon (*Procyon lotor*) (prints), and gray fox (*Urocyon cinereoargenteus*) (prints) (see Appendix 4, Photo 12). The riparian corridor and wetland complex in the northwest portion also functions as an important wildlife movement corridor (see Appendix 4, Photo 8).

6.0 Conclusions

The purpose of this Updated Biological Report was to determine the biological resources and habitat available within the project site, analyze any potential impacts that may occur from the proposed project, and provide recommendations to reduce or eliminate impacts to biological resources. The conclusions of this Report are summarized below.

Recommendations for avoiding and/or mitigating potential project-related impacts are provided in Section 7.0 (Recommendations). In addition to the recommendations provided by SHN, the recommendations in Section 7.0 include measures proposed by Royal Gold to mitigate for

encroachments into the SMAs at the project site. All of the recommendations in this Report should be included as mitigation measures in the Biological Resources section of the CEQA document being prepared for the project. The project as designed, in compliance with existing regulatory requirements, and as mitigated by implementation of the recommendations in this Report, is not expected to result in any significant impacts to biological resources.

6.1 Special-status Botanical Species

No special-status botanical species were observed within the study area during the survey effort. Although habitat exists onsite for six special-status plants, the habitat is of marginal value due to historical disturbance, high dominance by invasive species, and ongoing industrial use of the site. Therefore, it is not expected that the proposed project would result in any significant impacts to special-status botanical species.

Although not required to reduce impacts to special-status botanical species to less than significant, there are several recommendations for mitigation in Section 7.0 (Recommendations) of this Report that, when implemented, will improve suitable habitat for special-status plants and will improve conditions at the project site for native botanical species in general. This includes the following:

- Development of the wetland mitigation area in the northwestern portion of the site (see Appendix 3).
- The removal of invasive botanical species in several areas of the site (see Figure 8-Mitigation Measures Proposed for SMA Encroachments).
- The proposed wetland and riparian enhancement activities in several areas of the site (see Figure 8-Mitigation Measures Proposed for SMA Encroachments).

It is also expected that compliance with the 50-foot setbacks required by the County SMAWO for intermittent drainages and seasonal wetlands, where proposed, will improve habitat conditions for special-status and native botanical species at the site.

6.2 Special-status Animal Species

Special-status animal surveys and a habitat assessment occurred at the project site in 2021 as part of the preparation of this Updated Biological Report. One special-status animal species was observed within the study area during the surveys, which was the northern red-legged frog. Egg masses were observed in pooled water in the northern portion of the study area, which is proposed for wetland creation as mitigation for existing and proposed wetland impacts within the project area (see Figure 2-Study Area and Appendix 4, Photo 9). There is also the potential for this species to occur within the existing and proposed stormwater detention basins at the site. Without mitigation, there is the potential for significant impacts to the northern red-legged frog from annual maintenance activities in the stormwater detention basins and construction of the proposed improvements (for example, additional paving, wetland mitigation area, etc.). To minimize impacts to this species, seasonal restrictions on the maintenance of stormwater detention basins and pre-construction surveys for special-status amphibians are recommended as mitigation for the proposed project in Section 7.0 (Recommendations). It is expected that with the implementation of these mitigation measures, that potential impacts of the project would be reduced to less than significant. Although the improvements proposed at the project site (for example, additional paving) may remove small areas of suitable breeding habitat for this species in the northern portion of the site, the project includes the construction

of a mitigation wetland at a 2:1 replacement ratio that will increase the area of habitat available to the northern red-legged frog and other native amphibians. It is also expected that compliance with the 50-foot setbacks required by the County SMAWO for intermittent drainages and seasonal wetlands, where proposed, will improve habitat conditions for special-status and native amphibian species at the site.

A focused bat survey was not conducted as part of the survey efforts for this Updated Biological Report. However, seasonal foraging habitat for the hoary bat exists within and adjacent to the project site and potential roosting habitat exists along the edges of the site. Due to the ongoing disturbance at the project site and more suitable undisturbed roosting habitat surrounding the site, this species is not likely to roost within the direct influence of the project. Therefore, project-related activities are not anticipated to have a significant impact on this species or its habitat.

6.3 Special-status Habitats and Natural Communities

6.3.1 Designated Critical Habitat

The project site does not contain designated critical habitat for species listed under the FESA. The CNDDB (CDFW, 2021b) reported that the nearest critical habitat is 0.16 miles away to the south (Hall Creek) and 0.25 miles to the west (Grassy Creek), specifically for the Steelhead.

Due to the distance from the project site, the only potential impact the project could cause to this critical habitat is through stormwater runoff. Stormwater discharges from the central and eastern portions of the project site flow to the south through a series of stormwater drainage ditches and culverts on adjacent private property, which discharge into Hall Creek and ultimately the Mad River. The Royal Gold operation is subject to the authority of the SWRCB. Pursuant to the Statewide General Permit for Storm Water Discharges Associated with Industrial Activities, SWRCB Order 2014-0057-DWQ (Industrial General Permit [IGP]), businesses in specified Standard Industrial Classification (SIC) codes must implement the IGP. Royal Gold's operations are in SIC Code 2875 (Fertilizers, Mixing Only). Royal Gold complies with the IGP with a SWPPP, which is periodically updated for current operational conditions. The company samples for stormwater characteristics and constituents including pH, total suspended solids (TSS), oil and grease (O&G), chemical oxygen demand (COD), nitrate + nitrite (nitrogen), total phosphorus, iron, aluminum, zinc, and lead. The primary stormwater pollutant constituents of concern and documented exceedances of the IGP Numeric Action Levels (NALs) at the Royal Gold site are iron, nitrate + nitrite (nitrogen), TSS, and COD.

Humboldt Baykeeper filed a CWA lawsuit against Royal Gold in 2016, which resulted in a settlement agreement that expired in 2019. Per the settlement agreement, a number of stormwater improvements were constructed at the site including installing additional paving. Royal Gold continues to construct stormwater improvements throughout the site for improved stormwater management facilities and practices and to comply with the requirements of the IGP. Several of these improvements included upgrades to the stormwater infrastructure at the site that was installed by others during past industrial use. As discussed above, these improvements include the conversion of the southern central wetland area at the site into stormwater detention basins. These stormwater management improvements, as identified in the SWPPP BMP Location Map (see Appendix 5), have resulted in significant reductions in the pollutant concentrations detected in stormwater discharging from the facility.

According to the stormwater sampling conducted at the Royal Gold site in December 2020 and April 2021, there were documented exceedances of the IGP NALs for iron (4.7 milligrams per liter [mg/L] vs.

NAL of 1.0 mg/L) and aluminum (0.795 mg/L vs. NAL of 0.75 mg/L) in the runoff discharging from the site. All other stormwater pollutant constituents of concern were below the NALs, including the constituents with prior documented exceedances (nitrate + nitrite, TSS, and COD).

The NAL values in the current SWRCB IGP (2014) are derived from the benchmark monitoring thresholds in the 2008 USEPA Multi-Sector General Permit (MSGP). The MSGP was recently reissued in January 2021, which included modifications to the benchmark monitoring thresholds for iron and aluminum. These modifications included, but are not limited to, the following:

- Removed the benchmark monitoring threshold for iron based on a lack of acute toxicity criteria; and
- Raised the aluminum benchmark monitoring threshold from 0.75 mg/L to 1.1 mg/L, based on current CWA Section 304(a) national recommended aquatic life water quality criteria.

As such, based on the latest scientific understanding, the NALs in the 2014 SWRCB IGP would be considered scientifically outdated. Although the 2014 IGP is administratively expired as of June 30, 2020, the SWRCB is not anticipating a reissuance of the IGP until 2023. At a minimum, the reissued IGP will institute NALs that are derived from and function similarly to the benchmark thresholds of the 2021 MSGP. Therefore, in the next iteration of the SWRCB IGP, iron is anticipated to be removed and the NAL for aluminum is anticipated to be increased to 1.1 mg/L. Based on the findings of a study prepared by the National Academy of Sciences, Engineering, and Medicine in 2019, the modifications to the USEPA MSGP would not compromise surface water quality standards (NAS, 2019). Therefore, the recent exceedances of the NALs for iron and aluminum at the Royal Gold facility would not result in exceedances of current water quality standards and would not be expected to cause significant impacts to the critical habitat along Hall creek.

Although Royal Gold may not be in exceedance of current water quality standards, to improve the stormwater management practices at the facility and minimize potential impacts to adjacent critical habitat, it is recommended that annual inspection and maintenance of the stormwater detention basins at the site be conducted. The requirement to conduct annual inspections and maintenance of the stormwater detention basins has been recommended as mitigation for the project in Section 7.0 (Recommendations). It is expected that with continued compliance with the IGP and implementation of this mitigation measure, impacts from the project would be less than significant.

6.3.2 Vegetation Communities

One sensitive vegetation community (Red alder Riparian Forest, sensitive vegetation community rank S2.2) was observed within the study area during the survey effort. This includes the red alder-dominated areas along the intermittent drainage in the northwestern portion of the site, which was delineated as containing an ordinary high-water mark (SHN, 2018). These areas are primarily composed of red alder saplings and are not high-quality examples of this vegetation community, but rather represent a transition from maintained drainage ditches to more natural botanical communities. These areas will be protected by compliance with the SMA setback standards of the County's SMAWO and consequently will not be impacted by the project. As discussed in Section 7.0 (Recommendations), Royal Gold proposes riparian enhancement along the northwestern drainage to mitigate for encroachments into SMAs in other portions of the site (see Figure 8-Mitigation Measures Proposed for SMA Encroachments). The riparian enhancement activities will improve habitat conditions along the northwestern drainage for native plants.

Several vegetation communities surround the project site including, upland mixed conifer forests to the north of the project site and riparian woodlands along the Mad River and its tributaries (for example, Hall Creek) to the southeast of the project. It is not anticipated that any of the surrounding vegetation communities will be impacted by the improvements and activities at the Royal Gold facility.

6.3.3 Wetland and Riparian Habitats

As indicated on Figure 4 (Drainages/Wetlands and SMA Boundary in Baseline Year (2009)), onsite wetland and riparian habitats consist of seasonal wetlands that occur within the northwestern and central portions of the project site and several intermittent drainages that occur along the northwestern, eastern, and southeastern portions of the site. The seasonal wetlands and intermittent drainages at the site provide potential habitat for a variety of wildlife including amphibians and nesting birds. In addition, isolated pools of seasonal water in the undeveloped grassland areas in the northern portion of the site provide temporary amphibian breeding habitat (see Appendix 4, Photo 7). Some of the stormwater management features at the site also may provide temporary habitat for wildlife, including aquatic species (Appendix 4, Photos 1, 2, 3, and 4). The stormwater management features at the site are illustrated in Appendix 5 (SWPPP BMP Location Map). The riparian corridor and wetland complex in the northwest portion of the site provides the highest quality habitat for wildlife breeding, foraging, and movement (see Appendix 4, Photo 8).

When Royal Gold moved to the site in 2009, it is estimated there were approximately 3.4 acres of wetlands at the project site (see Figure 4-Drainages/Wetlands and SMA Boundary in Baseline Year (2009) and Appendix 3, Figure 2; SHN, 2020). Since 2009, Royal Gold has impacted approximately 0.83 acres of wetlands at the site. This includes the wetlands in the central southern portion of the site that were converted to stormwater detention basins or filled for use as paving, parking, storage, and coco processing (see Figure 6-Site Plan with Baseline Year (2009) Streamside Management Area and Appendix 3, Figure 2; SHN, 2020). As part of full buildout of their facility, Royal Gold is proposing to impact approximately 0.74 acres of additional wetlands in the central eastern portion of the site (see Figure 6-Site Plan with Baseline Year (2009) Streamside Management Area and Appendix 3, Figure 2; SHN, 2020). This additional wetland area is proposed to be converted to stormwater detention basins or filled and developed as paving, storage areas, stormwater swales, and earthen berms. Therefore, of the 3.4 acres of wetlands onsite in 2009, 1.57 acres have been impacted or are proposed to be impacted by improvements at the Royal Gold facility. Royal Gold is proposing to mitigate the existing and proposed wetland impacts at a 2:1 replacement ratio through the construction of a mitigation wetland in the northwestern portion of the site. The proposed mitigation would result in the creation of a 3.18-acre wetland mitigation area (see Appendix 3; Figure 3; SHN, 2020). The wetland mitigation area will be contoured and planted with native wetland vegetation to create wetlands of equal or greater value than those impacted by the improvements at the Royal Gold facility. As a result of the proposed wetland mitigation, the total wetland area at the site will be increased by approximately 1.6 acres (3.4 to 5 acres) relative to the existing wetland area present when Royal Gold moved to the site in 2009. Additionally, the proposed wetland mitigation will concentrate the wetland habitat in the northwestern portion of the site adjacent to a large riparian/wetland complex, which is the highest quality habitat for wildlife at the site. The 50-foot SMA for the wetland mitigation area is also proposed to be planted with native botanical species to provide habitat screening and protect the created wetland habitat from disturbance. The requirement to implement the Wetland Mitigation and Monitoring Plan Addendum 1 (see Appendix 3; SHN, 2020) is recommended as mitigation for the project in Section 7.0 (Recommendations). It is expected that with the implementation of this mitigation measure, that impacts of the project would be reduced to less than significant.

Pursuant to Humboldt County Code Section 314-61.1 (SMAWO), a 50-foot SMA must be maintained around the seasonal wetlands and intermittent drainages at the project site. As indicated in Standard BR-S5 in Section 10.3 (Biological Resources) of the Conservation and Open Space Element of County General Plan, SMAs do not include watercourses consisting entirely of a manmade drainage ditch, or other man-made drainage device, construction, or system (County of Humboldt, 2017). As such, SMAs do not apply to the stormwater management features at the site (see Appendix 5). All development within or affecting SMAs, wetlands, or other wet areas not exempted under County Code Section 314-61.1.4, requires a Special Permit from the County. Figure 4 shows the SMA boundaries that are estimated to have applied in 2009 when Royal Gold moved to the site. Due to the existing improvements and disturbed condition of the site from past industrial activity (see Figure 3- Blue Lake Forest Products Historic Aerial Photo (Unknown Date)), at that time the SMA boundaries surrounding the drainages and wetlands contained limited habitat value. Much of the SMA boundaries contained pavement, stormwater improvements, compacted gravel surfaces, graded and compacted soils, or non-native, invasive vegetation. These conditions likely did not support special-status animal use of the area for shelter, foraging, or nesting.

Since moving to the site in 2009, Royal Gold has constructed several improvements to accommodate the needs of their business including, but not limited to, additional paving, two new buildings (arch-truss design consisting of steel tube trusses and polyethylene fabric covers), stormwater features (for example, detention basins, bioswales, etc.), security fencing, utility infrastructure, and the construction of earthen berms with imported fill and aggregate material (see Figure 5-Site Plan). As discussed above, improvements to the site have included the conversion of the wetlands in the southern central portion of the site to stormwater detention basins and the filling of some of these wetlands for use as paving, parking, storage, and coco processing (see Figure 4-Drainages/Wetlands and SMA Boundary in Baseline year (2009) and Figure 6-Site Plan with Baseline Year (2009) Streamside Management Areas). Several improvements constructed by Royal Gold also encroach into the SMA boundaries that are estimated to have been applicable in 2009. An after-the-fact Special Permit is required from the County of Humboldt for improvements that Royal Gold has constructed within SMAs since they moved to the site in 2009. A Special Permit is also required for some of the improvements that Royal Gold is proposing as part of the full buildout of their facility that will encroach into SMAs. As indicated in Figure 6 (Site Plan with Baseline Year (2009) Streamside Management Areas), the encroaching improvements (existing and proposed) include new buildings, paving, earthen berms, water tanks, parking, stormwater management features, a coco processing area, and storage areas. Figure 7 (Site Plan with Streamside Management Areas at Full Buildout) shows the modified SMAs that are proposed for full buildout of the facility. This includes an expansion of the SMA in the northwestern portion of the site and reductions along the eastern and southeastern boundaries. Some of the proposed SMA reductions are intended to reflect areas with existing improvements (for example, paving, stormwater improvements, etc.) constructed during past industrial use of the property.

As previously discussed, the habitat value present within the SMAs at the site in 2009 was fairly limited due to the existing improvements and disturbed condition of the site from past industrial activity. However, to mitigate for the existing and proposed encroachments into the SMAs at the project site, Royal Gold is proposing several habitat enhancements including the following: 1) enhancement of two existing wetland areas at the site; 2) enhancement of the riparian corridor along the northwestern boundary of the site; 3) invasive species removal in two areas at the site; and 4) security fencing along the western boundary of the site to prevent trespassing from adjacent residents and further degradation of the riparian corridor and wetlands. The location of the proposed habitat enhancements

EXPLANATION

- WATER TANKS
- SMA BOUNDARY AT FULL BUILDOUT
- DRAINAGE SWALE
- BERM
- BUILDINGS - EXISTING
- BUILDINGS - PROPOSED
- CONCRETE CAP AREA
- NO GROUND DISTURBANCE AREA
- PROPOSED PAVING
- FACILITY BOUNDARY

PHOTO SOURCE: GOOGLE EARTH, 4/30/2019

0 200

1" = 200'±

PROPOSED WETLAND MITIGATION AREA

BERM

EQUIPMENT WASH STATION

BERM

SAWDUST STORAGE

DETENTION BASIN

BIOSWALE

BERM (TO BE REMOVED)

DRAINAGE SWALE

BERM

FACILITY BOUNDARY

OUTER PROPERTY BOUNDARY

SCREENER

DETENTION BASIN

DETENTION BASIN

DETENTION BASIN

DETENTION BASIN

CONC. CAP

ENCLOSED COMPOST STORAGE

CONC. CAP

NO GROUND DISTUR-BANCE

GLENDALE DR.

\\Arcata\Projects\2016\016098A-Royal-Gold\GIS\Figures\BIO2\ USER: jsousa DATE: 9/10/21, 2:31PM

SHN	Royal Gold Updated Biological Report Glendale Dr., Humboldt, California	Site Plan with Streamside Management Areas at Full Buildout SHN 016098
	September 2021 | BIO2_Fig7_SMASitePlanFullBuildout	Figure 7

is shown in Figure 8 (Mitigation Measures Proposed for SMA Encroachments) and further detail is provided in Section 7.0 (Recommendations). The requirement to implement the proposed habitat enhancements is recommended as mitigation for the project in Section 7.0. It is expected that with the implementation of these mitigation measures, that potential impacts of the project would be reduced to less than significant.

With implementation of the wetland and habitat enhancement mitigations, and compliance with the requirements of the County's SMAWO, where proposed, it is expected that there will be a net increase in wetland and riparian habitat at the project site. Habitat conditions will also be improved as the mitigation wetland will provide higher quality wetlands than the isolated wetlands impacted and will be located adjacent to the existing riparian/wetland complex in the northwestern portion of the site, improving movement to and from the mitigation wetland. The increase in habitat quantity and quality is expected to improve site conditions for breeding amphibians and improve foraging habitat for other native wildlife.

6.3.4 Nesting Bird Habitat

Although low-quality relative to surrounding areas that are less disturbed and do not have ongoing industrial activity, there is nesting bird habitat for several bird species at the project site. Therefore, without mitigation, there is the potential for significant impacts to nesting birds during construction of the proposed improvements at the Royal Gold facility. To minimize impacts to nesting bird species, pre-construction surveys for nesting birds are recommended as mitigation for the proposed project in Section 7.0 (Recommendations). It is expected that with the implementation of this mitigation measure, potential impacts of the project would be reduced to less than significant.

6.3.5 Wildlife Movement Corridors

The riparian, wetland, and forested areas along the perimeters of the site provide adequate wildlife movement corridors between higher quality habitat areas surrounding the site (see Figure 2-Study Area). During the 2021 animal surveys, it was observed that there is a well-established trail on the northern and eastern boundaries of the site with signs of Roosevelt elk (scat), racoon (prints), and gray fox (prints; see Appendix 4, Photo 12). The riparian corridor and wetland complex in the northwest portion also functions as an important wildlife movement corridor (see Appendix 4, Photo 8). These established corridors should be preserved to allow continued wildlife movement.

In the Royal Gold Plan of Operations (Royal Gold, 2021), it indicates that it is proposed to construct additional security fencing at the site to prevent trespassing, vandalism, and theft. Royal Gold has indicated that the security fencing is primarily proposed along the western boundary of the site where most of the trespassing occurs by adjacent residents. If not designed properly, any fencing constructed in the northern portion of the site has the potential to inhibit use of the existing wildlife corridors. Therefore, without mitigation, there is the potential that the project would interfere with an established wildlife corridor. Barbed wire can snag animals and tangle legs, especially if wires are loose or spaced too closely together. Elk typically cannot jump a fence over 3.5 feet, but adult deer are capable of jumping a 6-foot fence. A minimum 12-inch spacing between the top two wires will be sufficient to prevent adult ungulate mortalities. At least the top wire should be smooth rather than barbed. Frightened ungulates, diving raptors, and other low-flying birds frequently strike wire fences simply because they do not see them. Attaching durable flagging or other markers to the fence can increase its visibility (Paige, 2008). To minimize potential impacts to wildlife movement at the site, recommendations

EXPLANATION

- WATER TANKS
- DRAINAGE SWALE
- BERM
- BUILDINGS - EXISTING
- BUILDINGS - PROPOSED
- CONCRETE CAP AREA
- NO GROUND DISTURBANCE AREA
- PROPOSED PAVING
- FACILITY BOUNDARY

PHOTO SOURCE: GOOGLE EARTH, 4/30/2019

N

0 200

1" = 200'±

WETLAND ENHANCEMENT AREA 1

RIPARIAN ENHANCEMENT AREA 1

PROPOSED SECURITY FENCE TO PREVENT TRESPASSING AND HABITAT DEGRADATION

PROPOSED WETLAND MITIGATION AREA

INVASIVE PLANT REMOVAL AREA 1

FACILITY BOUNDARY

OUTER PROPERTY BOUNDARY

BERM (TO BE REMOVED)

WETLAND ENHANCEMENT AREA 2

<P> DET. BASIN

INVASIVE PLANT REMOVAL AREA 2

DET. BASIN

DET. BASIN

DET. BASIN

CONC. CAP

ENCLOSED COMPOST STORAGE

CONC. CAP

NO GROUND DISTUR-BANCE

ENTRANCE/EXIT

ENTRANCE/EXIT

GLENDALE DR.

SHN	Royal Gold Updated Biological Report Glendale Dr., Humboldt County, California	Mitigation Measures Proposed for SMA Encroachments SHN 016098
	September 2021 | BIO2_Fig8_Mitigation	Figure 8

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for wildlife-friendly fencing are provided in Section 7.0 (Recommendations). It is expected that with the implementation of this mitigation measure, that potential impacts of the project would be reduced to less than significant.

7.0 Recommendations

The following recommendations are provided to ensure that the proposed project will not result in significant impacts to biological resources and sensitive habitat.

Seasonal restrictions on maintenance of stormwater detention basins: Maintenance activities including dredging and aquatic plant removal should occur outside the breeding and development season for special-status amphibians such as the northern red-legged frog. Maintenance activities should occur between June 1 and October 15. If dewatering is required as part of maintenance activities, pump intakes should be covered with 0.125-inch mesh to prevent entrapment of amphibians. If stormwater detention basin maintenance occurs between June 1 and August 31, nesting bird surveys should be conducted prior to maintenance activities according to the methods outlined in the "Nesting bird surveys" recommendation below.

Annual detention basin maintenance protocol: The following stormwater detention basin inspection and maintenance should be implemented annually during the specified seasonal window (June 1 to October 15) for all existing and proposed stormwater detention basins:

- Beginning after June 1 (to ensure that there are no significant impacts to amphibian species), all stormwater detention basins on the facility should be drained if water is still present. During draining, pump intakes should be covered with 0.125-inch mesh to prevent entrainment of amphibians.
- If special-status aquatic animals are encountered during detention basin maintenance (for example, Northern red-legged frog), non-listed* special status aquatic animal species should be relocated by a qualified biologist outside the area of impact to an appropriate location, in consultation with CDFW. (*Threatened, Endangered, or Candidate species cannot be relocated without an Incidental Take Permit from CDFW, although no listed species are expected to be encountered in the stormwater basins).
- Once the detention basins have dried up, they should be inspected for sediment accumulation.
- If sediment requires removal, that should be completed prior to October 1st.
- Vegetation should be thinned at the time of sediment removal depending on the species. The focus should be on removing fast growing floating aquatic plants and other fleshy wetland plants.

Special-status amphibian surveys: If construction or routine maintenance activities that involve grading or other ground disturbance begin during the breeding season (generally October 16 to May 31), a qualified biologist should conduct diurnal Visual Encounter Surveys (VES) for special-status amphibian species within and immediately adjacent to the project area(s) no more than three days prior to activities. If egg masses or tadpoles are located during the survey, one of the following protective measures should be implemented:

- Do not commence construction or routine maintenance activities that involve grading or other ground disturbance until after May 31; or
- Monitoring shall be done by a qualified biologist every seven days until amphibians have metamorphosed to subadults (or experience natural mortality); or
- Non-listed* special-status aquatic species (egg masses or larval-stage) should be relocated outside the area of impact to an appropriate location, in consultation with CDFW, by a qualified biologist prior to construction activities. (*Threatened, Endangered, or Candidate species cannot be relocated without an Incidental Take Permit from CDFW).

Wetland mitigation: To mitigate for existing and proposed impacts to approximately 1.57 acres of wetland area at the project site, Royal Gold should implement the Wetland Mitigation and Monitoring Plan Addendum 1 (see Appendix 3).

Habitat enhancements for encroachment into SMAs: To mitigate for existing and proposed encroachments into the SMAs at the project site, the following habitat enhancements are proposed. The location of the proposed habitat enhancements is shown in Figure 8 (Mitigation Measures Proposed for SMA Encroachments).

- Wetland Enhancement Area 1: This would involve enhancement of approximately 19,166 square feet (s.f.) of lesser-functioning wetlands on the edge of the wetland complex in the northwest portion of the site (see Figure 8). The enhancement activities would include the removal of non-native botanical species and planting of freshwater emergent wetland plants including Pacific willow, arroyo willow, Douglas spirea (*Spirea douglasii*), salmonberry (*Rubus spectabilis*), common rush, spreading rush (*Juncus patens*), panicled bulrush (*Scirpus microcarpus*), tall flatsedge (*Cyperus eragrostis*), slough sedge (*Carex obnupta*), brownhead rush (*Juncus phaeocephalus*), and arctic sweet colt's foot (*Petasites frigidus*). The planting recommendations for this area are included in the Wetland Mitigation and Monitoring Plan (SHN, 2019), which is attached to the Wetland Mitigation and Monitoring Plan Addendum 1 (see Appendix 2 of Appendix 3; SHN, 2020).

- Wetland Enhancement Area 2: This would involve enhancement of approximately 6,568 s.f. of lesser-functioning wetlands on the eastern boundary of the site (see Figure 8). This includes a portion of the wetland area that would be remaining after the improvements are completed for full buildout of the Royal Gold facility. The enhancement activities would include the removal of non-native botanical species and planting of similar freshwater emergent wetland plants to what is proposed for Wetland Enhancement Area 1. The planting recommendations in the Wetland Mitigation and Monitoring Plan (SHN, 2019) would also be applied to Wetland Enhancement Area 2 (see Appendix 2 of Appendix 3; SHN, 2020).

- Riparian Enhancement Area 1: This would involve enhancement of a 12,854 s.f. portion of the riparian corridor in the northwestern portion of the site (see Figure 8) that has been impacted by adjacent residents to the west of the Royal Gold facility. The impacts that have occurred to this area of the site have included dumping of trash, abandonment of vehicles, spilling of oils and fuels, erosion and sedimentation, and the construction of unpermitted stream crossings, culverts, and berms/impoundments. The enhancement activities would include the removal of trash and sources of contamination in and around the stream channel, stabilization of stream channel erosion, the removal of unpermitted stream crossings, culverts, and

berms/impoundments, removal of invasive botanical species, and the planting of native botanical species. Native botanical species that would be planted in this area include those found within the lesser disturbed portions of the stream such as slough sedge, common rush, water parsley (*Oenanthe sarmentosa*), and skunk cabbage (*Lysichiton americanus*).

- Invasive Species Removal Area 1: This would include the removal and continued management of invasive botanical species in an approximately 14,444 s.f. area in the northeastern corner of the site. The botanical species to be targeted for removal include scotch broom (*Cytisus scoparius*) and pampas grass (*Cortaderia jubata*). This enhancement activity will minimize the potential for the spread of these invasive botanical species at the project site and on adjacent properties to the north and east.

- Invasive Species Removal Area 2: This would include the removal and continued management of invasive botanical species in an approximately 36,332 s.f. area in and around the central stormwater detention basins at the site. The botanical species to be targeted for removal include scotch broom and pampas grass. This enhancement activity will minimize the potential for the spread of these invasive botanical species at the project site, at downstream locations, and offsite.

- Security Fencing: Similar to the concept behind the use of livestock exclusionary fencing to protect riparian and wetland areas, it is proposed to construct security fencing along the western boundary of the site to prevent continued trespassing by adjacent residents and further degradation of the riparian corridor and wetlands in the northwest portion of the site. The alignment of the proposed fencing is shown in Figure 8 (Mitigation Measures Proposed for SMA Encroachments). The security fencing will increase the likelihood of success for the enhancement activities proposed for Riparian Enhancement Area 1.

Nesting bird surveys: If construction activities begin during the bird nesting season (generally March 15 to August 31), a qualified biologist should conduct nest surveys no more than seven days prior to activities, within the construction limits and within 100 feet (200 feet for raptors) of the construction limits. If an active nest is located during the survey, the following protective measures should be implemented:

- A no-disturbance buffer should be established around the nest by the qualified biologist, in consultation with CDFW and USFWS.
- Protective buffers (no-disturbance area around the nest) should be established at a distance determined by the biologist based on the nesting species, its sensitivity to disturbance, and type of and duration of disturbance expected. Protective buffers should remain in place until the young have fledged.
- Construction activities outside buffers may proceed while active nests are being monitored, at the discretion of the qualified biologist. If active nests are found to be at risk due to construction activities, construction activities should be delayed until the qualified biologist determines that the young have fledged.

Wildlife Movement: To allow for the continued movement of wildlife through the established wildlife corridors at the project site, without entrapment or entanglement, the following fencing design recommendations should be followed:

- If fencing is installed along the northern or eastern property boundaries of the project site, it should be a smooth wire or rail no more than 40" high and the lowest rail/wire 18" above the ground. If using a wire fence, the top two wires should be at least 12" apart (Paige, 2008).
- It is recommended that the 6-foot-tall security fencing proposed along the western property boundary of the Royal Gold facility be designed without barbwire or razor wire. However, if it is determined that barbwire or razor wire are essential to preventing trespassing at the facility, the fencing should be designed according to the following specifications (see Figure 9):

    - From the ground to 48 inches (0 to 4 feet), install chain link fence with 6-foot-tall poles.
    - From 48 to 60 inches (4 to 5 feet), install flat wrap razor wire affixed to the chain-link fence and the 6-foot-tall poles, and place flagging or reflective material attached to the flat wrap razor wire (see photo) throughout the length of the fence.
    - From 60 to 72 inches (5 to 6 feet), install two lines of smooth wire (12 inches apart) pulled taught and affixed to the 6-foot-tall poles.

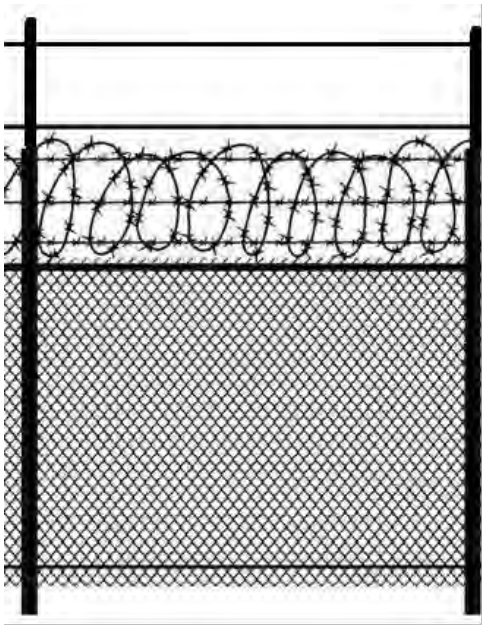

Figure 9 – Proposed Security Fencing Design

Photo example of flat wrap razor wire

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Biological Survey for the Expansion of Soil Manufacturing Operations (SHN, 2017)

1

Biological Survey for the Expansion of Soil Manufacturing Operations

Glendale, CA

Prepared for:

Royal Gold LLC

SHN Engineers & Geologists

1062 G Street, Suite I
Arcata, CA 95521
707-822-5785

August 2017
016098

CONSULTING ENGINEERS & GEOLOGISTS, INC.
1062 G Street, Suite I • Arcata, CA 95521 • 707-822-5785 • FAX: 707-822-5786 •arcatainfo@shn-engr.com

Reference: 016098

August 31, 2017

Chad Waters
Royal Gold LLC
1689 Glendale Drive
Arcata, CA 95521

Subject: Biological Survey for the Expansion of Soil Manufacturing Operations

Dear Chad:

SHN Engineers & Geologists has prepared this Biological Survey for the Royal Gold LLC Expansion in Glendale on behalf of Royal Gold LLC. This Survey addresses potential impacts to habitat found onsite and special status species potentially present. Suggested mitigation and conclusions are included at the end of the Survey.

The northern red-legged frog has been documented within the project area. After implementation of the suggested mitigation, the project will have less of an impact on the habitat found within the project area.

If you have any comments or concerns, call me at (707) 822-5785 and I will be happy to discuss them with you.

Sincerely,

SHN Engineers & Geologists

Joseph Saler
Botanist/Biologist

JLS:ceg

Enclosure: Biological Survey for the Expansion of Soil Manufacturing Operations

Reference: 016098

Biological Survey for the Expansion of Soil Manufacturing Operations

Prepared for:

Royal Gold LLC
1689 Glendale Ave., Arcata, CA 95521

Prepared by:

Engineers & Geologists
1062 G Street, Suite I
Arcata, CA 95521
707-822-5785

August 2017

QA/QC: JLS

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Table of Contents

List of Illustrations

Abbreviations and Acronyms

BIOS	Biogeographic Information and Observation System
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
DPS	Distinct Population Segment
ESU	Evolutionarily Significant Unit
IPaC	Information for Planning and Conservation
NR	no reference
RTE	rare, threatened, or endangered
SHN	SHN Engineers & Geologists
USGS	United States Geological Survey

1.0 Introduction

On January 17, 24, 25, and July 27, 2017, SHN Engineers & Geologists biologist conducted biological site reconnaissance and surveys for special status biological species[1] within the area of potential effect for the Royal Gold LLC soil manufacturing operation (see Figure 1- Project Location). The study area for biological surveys included the areas currently used by Royal Gold and the areas where the company proposes to expand as part of their Conditional Use Permit application with Humboldt County (see Figure 2 - Study Area). The site is within the United States Geological Survey (USGS) 7.5-minute Arcata North quadrangle located in Humboldt County. This Technical Memorandum documents the biological site investigations and findings, as well as listed species scoping results.

2.0 Methodology

Database queries of listed species and special habitats known from the area were performed during the month of January 2017. The following references were reviewed:

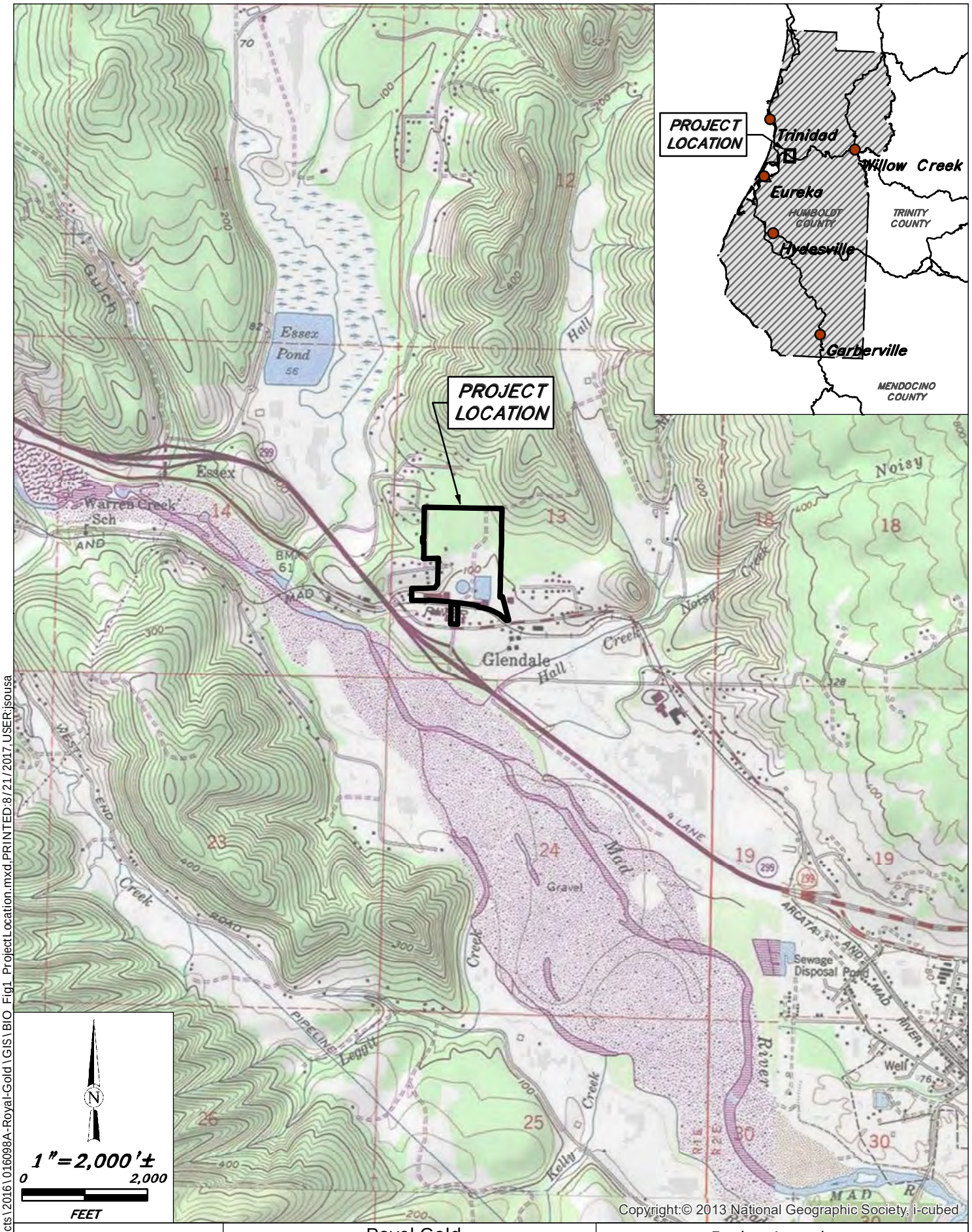
- California Natural Diversity Database (CNDDB) query for the Arcata North and surrounding USGS 7.5 minute topographic quadrangles (Trinidad, Crannell, Panther Creek, Tyee City, Blue Lake, Eureka, Arcata South, and Korbel) (CDFW, 2017a);
- CNDDB Rarefind Tool for the Arcata North and surrounding USGS 7.5 minute topographic quadrangles (BIOS; CDFW, 2017b);
- Electronic Inventory of Rare and Endangered Vascular Plants of California (California Native Plant Society [CNPS], 2017) query for a list of all plant species reported for the Arcata North and surrounding USGS 7.5 minute topographic quadrangles;
- United States Fish and Wildlife Service (USFW) Listed/Proposed Threatened and Endangered Species for the Arcata North and surrounding USGS 7.5 minute topographic quadrangles (Candidates Included; USFW, 2017);
- United States Fish and Wildlife Service (USFW) Information for Planning and Conservation (IPaC, USFW, 2017b).

From the database queries, a list of potential target species for the study area was compiled. "Table A-1 and A-2 in Appendix A includes species reported by the CNDDB, CNPS, and USFWS.

Additionally, USFWS's Critical Habitat Portal was queried for habitat designated as critical for species listed under the Federal Endangered Species Act. No critical habitat is designated within the project area boundaries. Within the lands surrounding the project there is critical habitat designated for two species. This includes several waterways listed as critical habitat for the threatened Northern California Distinct Population Segment (DPS) for Steelhead (*Oncorhynchus mykiss*) and the California Coastal Evolutionarily Significant Unit (ESU) of Chinook salmon (*Oncorhynchus tshawytscha*).

Each species was evaluated for its potential to occur within the study area according to the following criteria:

[1] The Term "Special Status Species" is used collectively to refer to species that are state or federally listed, species that are state or federal candidates for listing, and all species listed by the California Natural Diversity Database. This term is consistent with the biological resources that need to be assessed pursuant to the California Environmental Quality Act.



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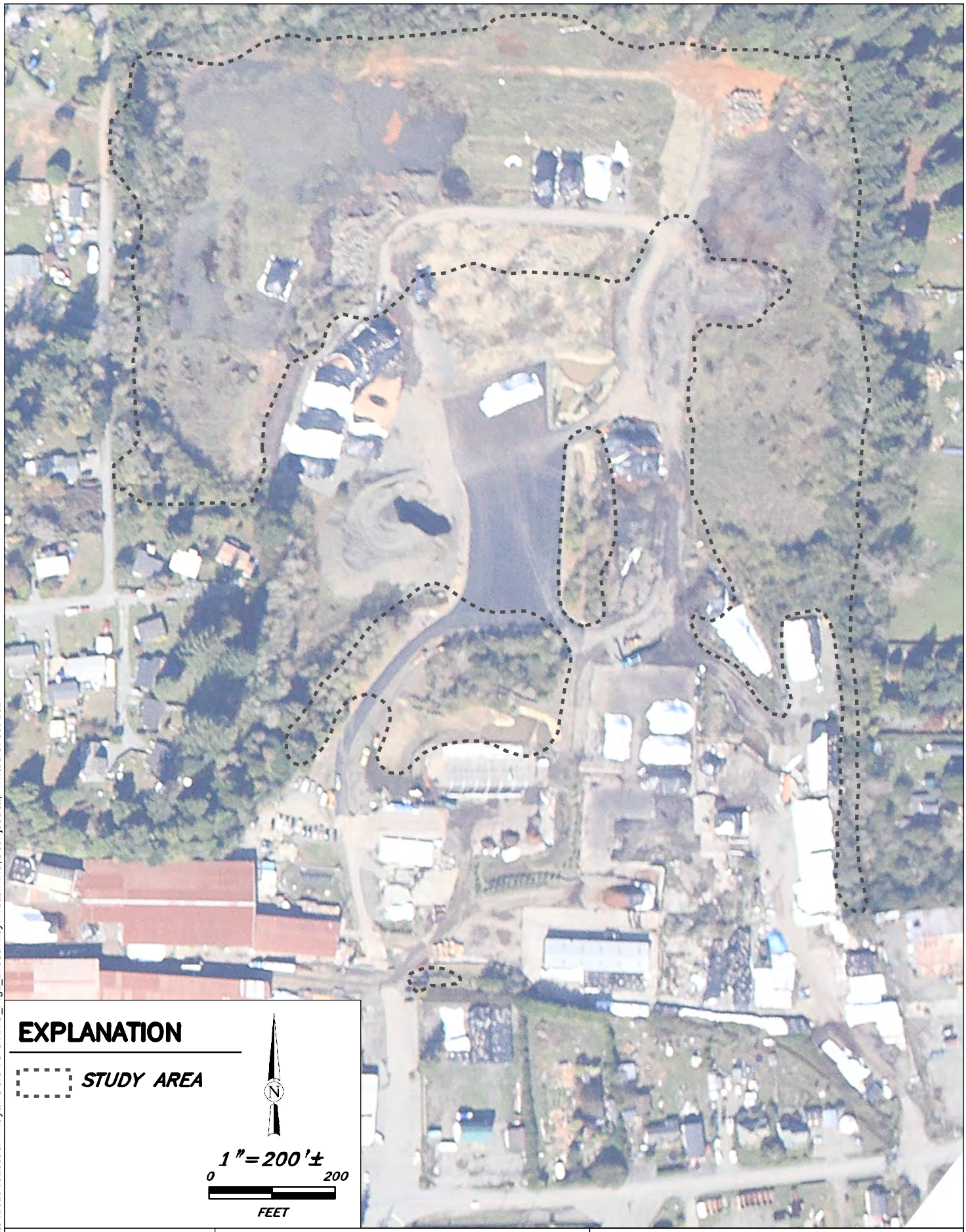
SHN Consulting Engineers & Geologists, Inc.

Royal Gold Biological Survey Glendale, Humboldt County, California		Project Location SHN 016098
August 2017	BIO_Fig1_ProjectLocation	Figure 1



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Consulting Engineers & Geologists, Inc.

Royal Gold
Biological Survey
Glendale, Humboldt County, California

Survey Areas

SHN 016098

August 2017 | BIO_Fig2_BioSurveyAreas | Figure 2

None. Species listed as having "none" are those species for which:

- there is no suitable habitat present in the study area (that is, habitats in the study area are unsuitable for the species requirements [for example, elevation, hydrology, plant community, disturbance regime, etc.]).

- **Low**. Species listed as having a "low" potential to occur in the study area are those species for which:
  - there is no known record of occurrence in the vicinity, and
  - there is marginal or very limited suitable habitat present within the study area.
- **Moderate**. Species listed as having a "moderate" potential to occur in the study area are those species for which:
  - there are known records of occurrence in the vicinity, and
  - there is suitable habitat present in the study area.
- **High**. Species listed as having a "high" potential to occur on the study area are those species for which:
  - there are known records of occurrence in the vicinity (there are many records and/or records in close proximity), and
  - there is highly suitable habitat present in the study area.
- **Present**. Species listed as "present" in the study area are those species for which:
  - the species was observed in the study area.

SHN's biologist conducted site visits on January 17, 24, 25, and July 27, 2017, for an assessment of the habitat, plant and animal species present, vegetation communities found within the project area, and the potential for the occurrence of any listed plant or animal species, or associated habitat. The survey was floristic in nature, with an attempt to identify all species present, including possible species of special concern (CDFW, 2009). The entire area of potential disturbance from the expansion project was surveyed, but the survey primarily focused on approximately 21 acres in the northern portion of the project area proposed for increased soil storage, processing, and potential wetland mitigation area (see Figure 2- Study Area). In addition, the drainages surrounding the project area were investigated during the survey for potential amphibian habitat and unique plant communities. Extra attention was given to potential habitat of listed species. An early morning bird survey was conducted during the July survey, with attention given to vegetated areas and potential nest sites. Regions beyond the property line were not surveyed, as well as areas that are currently developed (e.g., structures, pavement, etc.), or being used in processing or storing soils, as these areas will not be directly impacted by the expansion, or are already developed such that there will be no additional impacts from the expansion. In addition to surveying for target species, a list of all botanical and animal species encountered was compiled (Table A-3 and A-4, in Appendix A). Plant and animal species were identified to the lowest taxonomic level possible to distinguish special-status species from others. Botanical nomenclature follows *The Jepson Manual, Vascular Plants of California* (Baldwin et al., 2012) and subsequent taxonomic revisions made to the Jepson eflora (Jepson Flora Project, 2017).

Site photographs from the site visits are included in Appendix B.

3.0 Results

Existing Site Conditions

A search of the CNDDB, CNPS, USFWS, IPaC, and Calflora for known rare, threatened, or endangered (RTE) species within the Arcata North and surrounding quadrangles resulted in a total of 126 RTE species. This included 71 RTE plant species and 55 RTE animal species, including 5 amphibian, 31 bird, 9 fish, 3 insect, 5 mammal, 1 mollusk, and 1 reptile species. Of the 126 RTE species queried, 11 have a moderate or higher potential to occur within the study area (see Figure 2 - Study Area). This includes three RTE plant species, and eight RTE animal species which are adapted to disturbed and manipulated sites, such as is found within the project area, and therefore could potentially exist on site or within the immediate surrounding area. The bulk of the remaining species reported as occurring within the Arcata North and surrounding quadrangles require wetland, forest, foredune, and coastal and aquatic habitats, and other less disturbed locations and do not have suitable habitat within the project area. This is a disturbed site that has been used for industrial purposes since the 1950s. Analysis of the existing conditions, and species found onsite, were used to determine if project activities would have any adverse impacts to biological resources potentially utilizing the site and its immediate surroundings.

The area to be impacted by the proposed expansion has been primarily used as a log deck for various lumber companies from the 1950s until 2002, at which point the mill closed and was turned into a green waste recycling center and composting operation. Aerial imagery of the site from to 2003 to 2009 (see Appendix C - Historic Aerial Photos) shows multiple changes across the site, with soils being excavated and filled in different areas, and gravel being stored on site. Throughout this period there is a noticeable increase in vegetation along the perimeter of the site. It was also during this period of time that the majority of the mill buildings were removed from the site. In 2009, Royal Gold moved operations to the site and have been increasing operations since that time. From 2009 to 2015, the majority of the Royal Gold operations remained on paved areas in the southern portion of the site. Beginning in 2015, Royal Gold began expanding into the northern portion of the site. These additional areas are primarily used for materials storage and stormwater management (see Appendix C - Historic Aerial Photos).

A total of 120 plant species were observed, of which 45 percent were native species. No listed plant species were observed during the surveys. Two non-listed amphibian species were observed, as well as 27 non-listed bird species, 5 non-listed mammal species, and three non-listed insect species (see Tables A-3, and A-4, Appendix A). Surveys were conducted in January and July. It must be noted that additional species are likely to be observed during a mid-spring site visit; however it is not likely that any of the listed species potentially occurring onsite were missed. Nine of the 71 RTE plant species reported in the nine quadrangle scoping lists had bloom periods that were missed due to the timing of the surveys. Of the nine species with bloom periods outside of the survey dates, only the Howell's montia (*Montia howellii*) had a moderate or higher potential of occurring within the study area. Howell's montia has a bloom period between February and May. During the late January surveys, a nearby Howell's montia reference site was visited and the Howell's montia was observed to be in bloom.

Vegetation Communities

There were no natural vegetation communities present within the study area. Vegetation was limited across the site, with many areas not supporting vegetation due to compacted gravel and regular vehicle traffic. Less disturbed areas supported non-native grasslands dominated by tall

fescue (*Festuca arundinaceae*), velvet grass (*Holcus lanatus*), sweet vernal grass (*Anthoxanthum odoratum*) hairy cats-ear (*Hypochaeris radicata*), and in some places toad rush (*Juncus bufonius*). The edges of the project area support a developing canopy of red alder (Alnus rubra), arroyo willow (*Salix lasiolepis*), and young conifers such as Sitka spruce (*Picea sitchensis*) and Douglas fir (*Pseudotsuga menziesii*). These areas may represent a developing red alder (*Alnus rubra*) forest alliance within the drainage ditches and wetter portions of the project area. Red alder forest has a rarity ranking of G5S4 meaning, secure globally, and presumably secure within the state of California. The areas within the project area supporting red alder saplings are not high quality examples of this vegetation community, but rather represent a transition from maintained drainage ditches to more natural plant communities. Numerous vegetation communities surround the project site including, upland conifer forests to the north of the project and riparian black cottonwood (*Populus trichocarpa*), red alder, and Salix woodlands along the Mad River, and larger tributaries such as Hall Creek to the southeast of the project. It is not anticipated that any of the surrounding vegetation communities will be impacted by the expansion project.

Special Status Plant Species

During the January and July field surveys, all special status species potentially present (Appendix A, Table A-1 and Table A-2) in the project area were targeted. Seventy one (71) plant species were reported as existing within the Arcata North and surrounding quadrangles (CNDDB, 2017a; CNPS, 2017; USFW, 2017b). Of the 71 plant species reported within the area, three had a moderate or higher potential to exist on the property. The botanical surveys were floristic in nature; however the early spring survey was not conducted. None of the RTE plant species with moderate or higher potential of occurrence were missed due to timing of the survey. Due to the disturbed nature of the study area, it is unlikely that any special status plant species exist on-site. However, potential habitat for Rattan's milk vetch (*Astragalus rattanii* var. *rattanii*), Howell's montia (*Montia howellii*), and the maple leaved checkerbloom (*Sidalcea malachroides*) was present throughout the lesser disturbed portions of the project area.

Rattan's milk vetch (*Astragalus rattanii* var. *rattanii*) is a perennial herb in the Fabaceae family. Its elevation range is reported from 30-825 meters above sea level. Within its range state-wide, its blooming period is reported as April through July. This species is reported from open grassy hillsides, gravely flats in valley bottoms, and gravel bars of streambeds. Degraded habitat may exist locally for this species however it was not detected within the study area.

Howell's montia (*Montia howellii*) is an annual herb in the Montiaceae family. Its elevation range is reported from 0 to 835 meters above sea level. Within its range state-wide, its blooming period is reported as March through May. This species is reported from vernally mesic meadows and seeps, North Coast coniferous forests, and sometimes roadside habitats. Although habitat may exist locally for this species, it was not detected within the study area.

The maple leaved checkerbloom (*Sidalcea malachroides*) is a perennial herb in the Malvaceae family. Its elevation range is reported from 0 to 730 meters above sea level. Within its range state-wide, its blooming period is reported as April through August. This species is reported from broadleafed upland forest, coastal prairie, coastal scrub, North Coast coniferous forests, and riparian woodlands; often in disturbed areas. Although habitat may exist locally for this species, it was not detected within the study area.

The project area was scrutinized for these species and other species listed as potentially occurring within the project area, however, no special status species were observed during the surveys. The

lack of listed species observed is most likely due to the fact that the habitat found onsite is of low quality or is non-existent and has been continuously manipulated since the 1950s. Large portions of the survey area consist of unvegetated gravel and clay that is regularly driven over by equipment. Vegetated areas averaged only 44 percent native species, with high cover by tall fescue and other non-native grasses and herbs. The most likely areas for the three listed species to occur was within the borders of the project area. This area consists of formerly maintained drainages that now support red alder and willow saplings, rubus species, and pampas grass. The edges were highly scrutinized for potential habitat for the maple leaved checkerbloom and Rattan's milk vetch; however neither species were observed or are expected to exist due to the high level of shrubs and cover within the border.

The Howell's montia was most likely to occur on site due to lack of competing vegetation and the gravelly disturbed nature of the site in large portions of the proposed project area. A Howell's montia reference site was visited within Arcata and the plants were readily observable. The site was traversed and scrutinized for Howell's montia, however it was not observed within the survey area.

Special Status Animal Species

During the January and July field surveys, all special status species potentially present (Appendix A, Table A-2) in the project area were targeted. A total of 55 special status animal species were reported as occurring within the Arcata North and eight surrounding 7.5 minute quadrangles. Of these species, eight have a moderate or higher potential of occurring within the project area. The majority of the animal species recorded for the Arcata North and surrounding 7.5 minute quadrangles do not have habitat present on site, or the habitat on-site is of such low quality that it is not expected to support individuals of the species. The species with a moderate or higher potential of occurring within the project area include the red-legged frog (*Rana aurora*), Cooper's hawk (*Accipiter cooperii*), great egret (*Ardea alba*), great blue heron (*Ardea Herodias*), American peregrine falcon (*Falco peregrinus anatum*), osprey (*Pandion haliaetus*), black-capped chickadee (*Poecile atricapillus*), and the yellow warbler (*Setophaga petechia*). No listed species reported as occurring within the Eureka and surrounding 7.5 minute quadrangles or those with moderate or higher potential of occurring on-site were observed during the surveys.

The red-legged frog (*Rana aurora*) is known to inhabit moist forests, woodlands, and streamsides in northwestern California. Habitat for this species is present within the project area and it is has been reported from within the survey area, although it was not observed during the 2017 surveys. Red-legged frogs are usually found near permanent water, but can be found far from water in damp woods and thick vegetation during non-breeding seasons. Drainages and standing water were scrutinized for this species, however it was not observed during the surveys. The red-legged frog has been observed within recent wetland delineation work, and it is expected that individuals of this species still exist within the project area. The drainages along the edges of the project area, and a seasonal water detention basin in the center of the project area represent habitat for the red-legged frog. Substrate within the drainages was fine silt, mud, and sand, with no rocky substrate. Herbaceous vegetation cover was dense within the drainages, and along the edges of the detention basin, although portions of the detention basin have been recently recontoured and do not yet support vegetation. The project will have minimal impacts on the existing red-legged frog habitat, as the drainages will be protected with 50-foot wetland setbacks which currently do not exist as evidenced by recent equipment encroachment. The detention basin has remained within the center of the soils operation, and conditions around this feature will remain unchanged. Furthermore, the

project includes the construction of additional wetlands within the survey area that will increase habitat available to the red-legged frog.

The Cooper's hawk (*Accipiter cooperii*) is known from woodlands and open, interrupted, or marginal habitat types. It is most common along forest edges where it hunts medium sized birds and a lesser amount of rodents. Cooper's hawk nest primarily in deciduous riparian trees in canyon bottoms and flood plains, and within forest edges in Douglas fir. It is likely that this species is occasionally found flying over, or hunting within the boundary of the proposed project area. Numerous medium sized birds were observed during the surveys that represent potential prey. The open nature of the project area surrounded by tree canopy represents ideal hunting conditions. It is possible that the ongoing industrial activity on the site precludes the existence of this species on site; however the number of prey species suggests that this species may occasionally hunt within the project boundary. Cooper's hawk was not observed during the surveys. The retention of and protection of the existing developing canopy and the creation of additional wetland and scrub habitat may improve habitat for the Cooper's hawk. It is likely that the project will have minimal impacts on this species due to the large number of openings surrounded by forest and riparian nesting sites within the general area of the project that represent better habitat for this species.

The osprey does not have habitat within the project area, and would only be seen in the project area during flyover to and from different feeding locations. Ospreys are known to nest around the Mad River, and other fish bearing waters. Ospreys hunt fish almost exclusively and require large dead snags overlooking a water body on which to construct their nest. No large water bodies or large dead snags exist within the project area, precluding the existence of this species onsite. There is the potential for osprey to flyover the project area hunting grounds, however due to the lack of habitat within the project area, the construction of the proposed project will have no effect on the osprey.

The great egret (*Ardea alba*) and the great blue heron (*Ardea herodias*) prefer open wetland areas such as marshes, tide-flats, irrigated pastures, margins of rivers, lakes and streams and wet meadows. Rookery sites for both species are located within large trees near the foraging sites. The project area does not contain any open wetland areas. There are several open season ponds along the boundary of the project area associated with the drainage. These ponds do support adult frog populations, as well as tadpoles and juvenile frogs which represent a potential food source for the great egret and great blue heron. The degraded nature of the site and shrubby cover of the majority of the wet areas surrounding the site make it unlikely that either the great egret or the great blue heron would be found onsite. Furthermore the ongoing industrial work conducted across the site would more than likely preclude these species from foraging within the proposed project area.

The American peregrine falcon (*Falco peregrinus anatum*) is found within a wide range of habitats. It is most likely to be found near wetlands, lakes, and rivers, but can be found in almost any open habitat. The American peregrine falcon hunts a wide range of bird species and is known for the speed at which it can fly to catch prey. Numerous bird species representing potential prey were observed during the survey, however the forested perimeter of the site and the presence of better suited habitat in nearby large open fields and along the Mad River make it unlikely that this species would hunt within the project area. The American peregrine falcon was not observed within the project area, and the ongoing industrial work at the site make it unlikely that it would be exist within the project area.

The black-capped chickadee (*Poecile atricapillus*) is found within riparian woodland throughout Del Norte and northern Humboldt Counties. It is also known to inhabit areas with trees or woody

shrubs from forests and woodlots to suburban areas, and disturbed areas where it is a frequent visitor to bird feeders. Within the natural environment it is found primarily in deciduous trees especially willows and alders along large or small watercourses. This species is known to forage on berries and seeds during the winter, but primarily eats insects during the spring and summer months. Nesting occurs primarily in deciduous trees along watercourses, where the nesting pair will excavate or find a woodpecker cavity. Habitat for this species does exist within the project area, and it is likely that this species could be found within the project area at some point throughout the year, however this species was not observed during the January and July surveys. A flock of chestnut-backed chickadees were observed at the time of the survey, indicating that conditions within the edges of the project area can support chickadees. The project is not anticipated to have a significant impact on the black-capped chickadee due to the presence of high quality habitat within the surrounding region in addition to the protection of the woody and brushy areas along the perimeter of the project area.

The yellow warbler (*Setophaga petechia*) is most commonly found within riparian areas, frequently nesting and foraging in willow shrubs and thickets and in other riparian plants, such as black cottonwood and red alder. It can also be found in thickets within disturbed areas, within reach of water. This species feeds on insects and builds nests in vertical forked branches. The species was not observed during the survey. Habitat for this species does exist within the shrubby drainages along the perimeter of the project area. The shrubby areas along the perimeter of the project area are to be protected by a 50-foot setback, and the presence of high quality habitat in the general area surrounding the project make it unlikely that this project will have an impact on the yellow warbler.

Migratory Birds
The study area consists of an open disturbed industrial site with little shrub growth. The perimeter of the project area contains drainage ditches that contain alder saplings and other shrubby vegetation growth. These areas contain likely nesting sites, although the continued use of industrial equipment across the site may dissuade many birds from nesting there. No major vegetation clearing is associated with this project, and impacts to potential nesting sites are anticipated to be minimal.

4.0 Conclusions

There are 71 RTE botanical species and 55 RTE animal species reported within Arcata North and the eight surrounding topographic quadrangles (CDFW, 2017a; CNPS, 2017; USFW, 2017; USFW, 2017b). This section summarizes conclusions based on the research and field investigations documented.

Of the 71 RTE botanical species reported, 3 species listed in Table A-1 (Appendix A) are considered to have a moderate or higher potential to occur within the study area. No RTE botanical species were detected during the survey, which may be due to the disturbed nature of the site and lack of habitat.

Of the 55 RTE animal species reported, 8 species listed in Table A-2 (Appendix A) are considered to have a moderate, or higher potential to occur within the study area. The red-legged frog (*Rana aurora*) was observed within the project area, and proper setbacks will be required for the protection of this species (see Recommendations below). No additional RTE animal species were detected

during the survey, which may be due to the disturbed nature of the site and lack of habitat, however a spring survey may be necessary depending on the level of impact the proposed project will have on the shrubby areas along the perimeter of the project.

5.0 Recommendations

- Wetland habitat for the red-legged frog should be avoided. A 50-foot buffer should be placed around the vegetated drainages along the perimeter of the project area, and changes to or encroachments into the central pond/detention basin should be limited to the dry season to avoid impacts to potential eggs or early life stages of the red-legged frog
- Any wetlands filled or impacted by the proposed project should be replaced at an appropriate ratio with wetlands of an equal or greater habitat value.
- An additional seasonally appropriate survey should be conducted in spring for RTE plant or animal species identified in this report as having potential habitat within the study area.
- In order to avoid take of any nesting species any clearing associated with the project should occur outside of the nesting period for migratory birds typically from March 1 through August 15 (CDFW Fish and Game code 3503, 3503.5, and 3513, and Federal Migratory Bird Act 16 U.S. code 703 et seq.). If clearing is to occur within the nesting window of migratory birds, the California Department of Fish and Wildlife (CDFW) and the United States Fish and Wildlife Service (USFW) should be consulted to assess the potential for take of active nests, or a focused nesting bird survey should take place immediately prior to and within the area of the proposed clearing. Surveys should also occur within a 100-foot buffer area around the clearing area, and a 200-foot buffer area for raptor nesting surveys.
- A 50-foot buffer should be designated between the drainage ditches and wetlands and the proposed expansion development. It is recommended that wetland mitigation be constructed within the 50-foot buffer area, with a 50-foot buffer placed around created wetlands as well.

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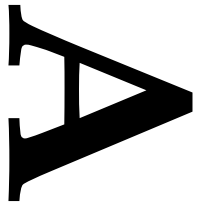

Species Lists

Table A-1
Regionally Occurring Special Status Plant Species Scoping List CNDDB, CNPS, IPaC
Royal Gold Biological Survey

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Abronia umbellata var. breviflora	pink sand-verbena	Nyctagin-aceae	None	None	G4G5-T2	S1	1B.1	June-Oct.	Coastal dunes and coastal strand.	Foredunes and interdunes with sparse cover. Usually the plant closest to the ocean. 0-10 m.	None
Angelica lucida	sea-watch	Apiaceae	None	None	G5	S3	4.2	May-Sept.	Coastal strand	Coastal bluff scrub, coastal dunes, coastal scrub, coastal salt marshes.0-150 m	None
Astragalus pycnostachyus var. pycnostachyus	coastal marsh milk-vetch	Fabaceae	None	None	G2T2	S2	1B.2	April-Oct.	Coastal dunes, marshes & swamps, coastal scrub.	Mesic sites in dunes or along streams or coastal salt marshes. 0-155 m.	None
Astragalus rattanii var. rattanii	Rattan's milk-vetch	Fabaceae	None	None	G4T4	S4	4.3	April-July	Chaparral, cismontane woodland, lower montane conifer forest.	Open grassy hillsides, gravelly flats in valleys, & gravel bars of stream beds. 30-825 m.	Moderate
Astragalus umbraticus	Bald Mountian milk-vetch	Fabaceae	None	None	G3	S2	2B.3	May-August	Cismontane woodland, lower montane coniferous forest.	Dry open oak and pine woodlands; sometimes on roadsides. 210-1220 m	Low
Bryoria pseudocapillaris	false gray horsehair lichen	Parmeli-aceae	None	None	G3	S2	3.2	Lichen	Coastal dunes, N. Coast conifer forest (immediate coast).	Usually on conifers. 0-90 m.	None
Bryoria spiralifera	twisted horsehair lichen	Parmeli-aceae	None	None	G3	S1S2	1B.1	Lichen	North coast conifer forest.	Usually on conifers. 0-30 m.	None
Calamagrostis bolanderi	Bolander's reed grass	Poaceae	None	None	G4	S4	4.2	May-August	Closed-cone conifer forest, N. coast conifer forest, broadleaf upland forest, coast scrub, marsh & swamps, meadows & seeps, bogs & fens.	Mesic sites. 0-455 m.	Low
Cardamine angulata	seaside bittercress	Brassic-aceae	None	None	G5	S1	2B.1	Jan.-July	Low montane, conifer forest, N. coast conifer forest, wetland	Wet areas, streambanks. 90-155 m.	None
Carex arcta	northern clustered sedge	Cyperaceae	None	None	G5	S1	2B.2	June-Sept.	Bogs and fens, north coast conifer forest.	Mesic sites. 60-1405 m.	None
Carex buxbaumii	Buxbaum's sedge	Cyperaceae	None	None	G5	S3	4.2	March-August	Bogs and fens, meadows and seeps, marshes and swamps.	Mesic sites. 3-3300 m.	None
Carex lenticularis var. limnophila	lagoon sedge	Cyperaceae	None	None	G5T5	S1	2B.2	June-August	Bogs & fens, marsh & swamp, N. coast conifer forest.	Lakeshores, beaches. Often in gravelly substrates. 0-6 m.	None

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Carex leptalea	bristle-stalked sedge	Cyperaceae	None	None	G5	S1	2B.2	March-July	Bogs and fens, meadows and seeps, marshes and swamps.	Mostly known from bogs and wet meadows. 3-1395 m.	Low
Carex lyngbyei	Lyngbye's sedge	Cyperaceae	None	None	G5	S3	2B.2	April-August	Marsh & swamp (brackish or freshwater).	0-200 m.	None
Carex praticola	northern meadow sedge	Cyperaceae	None	None	G5	S2	2B.2	May-July	Meadows and seeps.	Moist to wet meadows. 15-3200 m.	None
Carex viridula ssp. viridula	green yellow sedge	Cyperaceae	None	None	G5T5	S2	2B.3	June-July	Bogs and fens, marshes and swamps (freshwater), north coast coniferous forest.	Mesic sites. 0-1705 m.	None
Castilleja ambigua var. humboldtiensis	Humboldt Bay owl's-clover	Orobanch-aceae	None	None	G4T2	S2	1B.2	April-August	Marshes and swamps.	Coastal saltmarsh with Spartina, Distichlis, Salicornia, Jaumea. 0-20 m.	None
Castilleja litoralis	Oregon coast paintbrush	Orobanch-aceae	None	None	G3	S3	2B.2	June	Coastal bluff scrub, coastal dunes, coastal scrub.	Sandy sites. 5-255 m.	None
Castilleja mendocinensis	Mendocino Coast paintbrush	Orobanch-aceae	None	None	G2	S2	1B.2	April-August	Coast bluff scrub, coast scrub, coastal prairie, closed-cone conifer forest, coastal dunes.	Often on sea bluffs or cliffs in coastal bluff scrub or prairie. 0-160 m.	None
Chloropyron maritimum ssp. palustre	Point Reyes salty bird's-beak	Orobanch-aceae	None	None	G4?T2	S2	1B.2	June-Oct.	Coastal salt marsh.	Usually in coastal salt marsh with Salicornia, Distichlis, Jaumea, Spartina, etc. 0-10 m.	None
Chrysosplenium glechomifolium	Pacific golden saxifrage	Saxifrag-aceae	None	None	G5	S3	4.3	Feb.-June	North Coast conifer forest, riparian forest	Streambanks, sometimes seeps, or roadsides. 10-220 m.	Low
Collinsia corymbosa	round-headed Chinese-houses	Plantagin-aceae	None	None	G1	S1	1B.2	April-June	Coastal dunes.	10-30 m.	None
Coptis laciniata	Oregon goldthread	Ranuncul-aceae	None	None	G4	S3	4.2	March-April	North Coast coniferous forest, meadows and seeps.	Mesic sites such as moist streambanks. 0-1000 m.	None
Discelium nudum	naked flag moss	Disceliaceae	None	None	G4G5	S1	2B.2	Moss	Coastal bluff scrub.	Moss on moist silty clay to fine sandy banks in some-what shaded sites. 10-50 m.	None
Eleocharis parvula	small spikerush	Cyperaceae	None	None	G5	S4	4.3	July-August	Marsh & swamp, salt marsh, wetland	In coastal salt marshes. 1-3020 m.	None
Empetrum nigrum	black crowberry	Ericaceae	None	None	G5	S1	2B.2	July-August	Coastal bluff scrub, coastal prairie.	3-15 m.	None
Epilobium septentrionale	Humboldt County fuchsia	Onagraceae	None	None	G4	G4	4.3	July-Sept.	Broadleaf upland forest, north coast coniferous forest.	Dry, sandy or rocky ledges. 45-1800 m.	None

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Erigeron bloomeri var. nudatus	Waldo daisy	Asteraceae	None	None	G5T4	S3	2B.3	June-July	Lower montane coniferous forest, upper montane coniferous forest.	In open areas on dry rocky outcrops on serpentine. 730-1740 m.	None
Erysimum menziesii	Menzies' wallflower	Brassic-aceae	E	E	G1	S1	1B.1	March-Sept.	Coastal dunes.	Localized on dunes and coastal strand. 0-35 m.	None
Erythronium oregonum	giant fawn lily	Liliaceae	None	None	G4G5	S2	2B.2	March-June	Cismontane woodland, meadows and seeps.	Openings. Sometimes on serpentine; rocky sites. 300-1435 m.	None
Erythronium revolutum	coast fawn lily	Liliaceae	None	None	G4G5	S3	2B.2	March-August	Bogs & fens, broadleaf upland forest, N. coast conifer forest.	Mesic sites; streambanks. 60-1405 m.	Low
Fissidens pauperculus	minute pocket moss	Fissident-aceae	None	None	G3?	S2	1B.2	Lichen	North coast coniferous forest, Redwood.	On damp soil along the coast. In dry streambeds and on stream banks. 10-1024 m.	None
Fritillaria purdyi	Purdy's fritillary	Liliaceae	None	None	G4	S4	4.3	March-June	Chaparral, cismontane wood-land, low montane conifer forest.	Usually on serpentine. 175-2255 m.	None
Gilia capitata ssp. pacifica	Pacific gilia	Polemoni-aceae	None	None	G5T3	S2	1B.2	April-August	Coastal bluff scrub, chaparral, coastal prairie, valley & foothill grassland.	5-1345 m.	None
Gilia millefoliata	dark-eyed gilia	Polemoni-aceae	None	None	G2	S2	1B.2	April-July	Coastal dunes.	1-60 m.	None
Glehnia littoralis ssp. leiocarpa	American glehnia	Apiaceae	None	None	G5T5	S3	4.2	May-August	Coastal Dunes	0-20 m.	None
Hemizonia congesta ssp. tracyi	Tracy's tarplant	Asteraceae	None	None	G5T4	S4	4.3	May-Oct.	Coastal prairie N. coast conifer forest, ultramafic, valley & foothill grassland	Openings; sometimes on serpentine. 120-1200 m.	None
Hesperevax sparsiflora var. brevifolia	short-leaved evax	Asteraceae	None	None	G4T3	S2	1B.2	March-June	Coastal bluff scrub, coastal dunes, coastal prairie.	Sandy bluffs and flats. 0-215 m.	None
Hosackia gracilis	harlequin lotus	Fabaceae	None	None	G4	S3	4.2	March-July	Broadleaf upland forest, coast bluff scrub, coast prairie, coast scrub, closed-cone conifer forest, N. coast conifer forest, valley & foothill grassland.	Wetlands and roadsides. Meadow, seep, marsh & swamp. 0-700 m.	None
Iliamna latibracteata	California globe mallow	Malvaceae	None	None	G2G3	S2	1B.2	June-August	N. Coast conifer forest, chaparral, low montane conifer forest, riparian scrub (streambanks).	Seepage areas in silty clay loam. 60-2000 m.	Low

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Juncus nevadensis var. inventus	Sierra rush	Juncaceae	None	None	G5T3-T4	S1	2B.2	July-Nov.	Bogs and fens, Wetlands.	0-10 m.	None
Lasthenia californica ssp. macrantha	perennial goldfields	Asteraceae	None	None	G3T2	S2	1B.2	Jan.-Nov.	Coastal bluff scrub, coastal dunes, coastal scrub.	5-185 m.	None
Lathyrus glandulosus	sticky pea	Fabaceae	None	None	G3	S3	4.3	April-June	Cismontane woodland.	In oak woodlands upland from the coast redwood forests & along roadsides. 300-800 m.	Low
Lathyrus japonicus	seaside pea	Fabaceae	None	None	G5	S2	2B.1	May-August	Coastal dunes.	3-65 m.	None
Lathyrus palustris	marsh pea	Fabaceae	None	None	G5	S2	2B.2	March-August	Bogs & fens, lower montane conifer forest, marsh & swamp, N. coast conifer forest, coastal prairie, coastal scrub.	Moist coastal areas. 2-140 m.	None
Layia carnosa	beach layia	Asteraceae	E	E	G2	S2	1B.1	March-July	Coastal dunes, coastal scrub.	On sparsely vegetated, semi-stabilized dunes, usually behind foredunes. 0-30 m.	None
Lilium kelloggii	Kellogg's lily	Liliaceae	None	None	G3	S3	4.3	May-August	Lower montane conifer forest, N. coast conifer forest.	Gaps and roadsides in conifer forest. 3-1300 m.	None
Lilium occidentale	western lily	Liliaceae	E	E	G1	S1	1B.1	June-July	Coastal scrub, freshwater marsh, bogs & fens, coastal bluff scrub, coast prairie, N. coast conifer forest, marshes and swamps.	Well-drained, old beach washes overlain with wind-blown alluvium and organic topsoil; usually near margins of Sitka spruce. 3-110 m.	None
Listera cordata	heart-leaved twayblade	Orchidaceae	None	None	G5	S4	4.2	Feb.-July	Low montane conifer forest, N. coast conifer forest, Bog & fen.	5-1370 m.	Low
Lycopodiella inundata	inundated bog-clubmoss	Lycopodi-aceae	None	None	G5	S1	2B.2	June-Sept.	Bogs and fens, lower montane coniferous forest, marshes and swamps.	Peat bogs, muddy depressions, pond margins. 5-915 m.	None
Lycopodium clavatum	running-pine	Lycopodi-aceae	None	None	G5	S3	4.1	June-Sept.	Lower montane conifer forest, north coast conifer forest, marsh &swamp.	Forest understory, edges, openings, roadsides; mesic sites with partial shade and light. 45-1225 m.	Low
Lycopus uniflorus	northern bugleweed	Lamiaceae	None	None	G5	S4	4.3	July-Sept.	Bogs and fens, marshes and swamps, wetlands.	Wet places. 5-2000 m.	None
Mitellastra caulescens	leafy-stemmed mitrewort	Saxifrag-aceae	None	None	G5	S4	4.2	March-Oct.	Broadleaf upland forest, lower montane and N. coast conifer forests, meadows & seeps	Mesic sites. 5-1700 m.	Low

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Monotropa uniflora	ghost-pipe	Ericaceae	None	None	G5	S2	2B.2	June-Sept.	Broadleaf upland forest, north coast conifer forest.	Often under redwoods or west hemlock. 15-855 m.	None
Montia howellii	Howell's montia	Montiaceae	None	None	G3G4	S2	2B.2	Feb.-May	Meadows and seeps, north coast coniferous forest, vernal pools.	Vernally wet sites; often on compacted soil. 10-1005 m.	Moderate
Oenothera wolfii	Wolf's evening-primrose	Onagraceae	None	None	G2	S1	1B.1	May-Oct.	Coastal bluff scrub, coastal dunes, coastal prairie, low montane conifer forest.	Sandy substrates; usually mesic sites. 0-125 m.	None
Packera bolanderi var. bolanderi	seacoast ragwort	Asteraceae	None	None	G4T4	S2S3	2B.2	Jan.-August	Coastal scrub, north coast conifer forest.	Often along roadsides. 30-915 m.	Low
Piperia candida	white-flowered rein orchid	Orchidaceae	None	None	G3	S3	1B.2	May-Sept.	N. coast conifer forest, low montane conifer forest, broadleaf upland forest.	Sometimes on serpentine. Forest duff, mossy banks, rock outcrops, and muskeg. 45-1615 m.	None
Pityopus californicus	California pinefoot	Ericaceae	None	None	G4G5	S4	4.2	March-August	Broadleaf upland forest, upper montane and, N. coast conifer forest, low montane conifer forest.	Deep shade with few understory species, often under layer of duff, in rocky to clay loam soil. 15-2225 m.	None
Pleuropogon refractus	nodding semaphore grass	Poaceae	None	None	G4	S4	4.2	March-August	Meadow & seep, low montane conifer forest, N. coast conifer forest, riparian forest.	Mesic sites along streams, grassy flats in shaded redwood groves. 0-1600 m.	None
Polemonium carneum	Oregon polemonium	Polemoni-aceae	None	None	G3G4	S2	2B.2	April-Sept.	Coast scrub & prairie, low montane conifer forest.	0-1830 m.	None
Ribes laxiflorum	trailing black currant	Grossulari-aceae	None	None	G5	S4	4.3	March-August	N. coast conifer forest, Redwood forests.	Grows over logs and stumps in moist, wet places. 5-1395 m.	None
Romanzoffia tracyi	Tracy's romanzoffia	Boragin-aceae	None	None	G4	S2	2B.3	March-May	Coastal bluff scrub, coastal scrub.	Rocky sites. 15-300 m.	None
Sidalcea malachroides	maple-leaved checkerbloom	Malvaceae	None	None	G3	S3	4.2	March-August	Broadleaf upland forest, coast prairie, coast scrub, N. coast conifer forest,riparian.	Woodlands and clearings near coast; often in disturbed areas. 0-730 m.	Moderate
Sidalcea malviflora ssp. patula	Siskiyou checkerbloom	Malvaceae	None	None	G5T2	S2	1B.2	May-August	Coast bluff scrub, coast prairie, north coast conifer forest.	Open coastal forest; roadcuts. 5-1255 m.	Low
Sidalcea oregana ssp. eximia	coast checkerbloom	Malvaceae	None	None	G5T1	S1	1B.2	June-August	Meadow & seep, N. coast & low montane conifer forest.	Near meadows, in gravelly soil. 5-1805 m.	Low
Spergularia canadensis var. occidentalis	western sand-spurrey	Caryophyll-aceae	None	None	G5T4	S1	2B.1	June-August	Marshes and swamps (coastal salt marshes).	0-3 m.	None

Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Tiarella trifoliata var. trifoliata	trifoliate laceflower	Saxifrag-aceae	None	None	G5T5	S2S3	3.2	June-August	Lower montane coniferous forest, north coast coniferous forest.	Forest edge; moist shady banks. 170-1500 m.	None
Trichodon cylindricus	cylindrical trichodon	Ditrichaceae	None	None	G4	S2	2B.2	Moss	Broadleaf upland forest, upper montane conifer forest.	Openings on sandy or clay soil on roadsides, stream banks, trails, fields. 50-1500 m.	Low
Usnea longissima	Methuselah's beard lichen	Parmeli-aceae	None	None	G4	S4	4.2	Lichen	North coast coniferous forest, broadleaf upland forest.	In the "redwood zone" on tree branches, incl. big leaf maple, oaks, ash, Douglas-fir, and bay. 45-1465 m in CA.	Low
Viola palustris	alpine marsh violet	Violaceae	None	None	G5	S1S2	2B.2	March-August	Coastal scrub, bogs and fens.	Swampy, shrubby places in coast scrub or coastal bogs. 0-150 m.	None

1. Species indicator status as assigned by Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and California Department of Fish and Wildlife (CDFW)

C: candidate
CT: candidate threatened
D: delisted
DPS: distinct population segment
E: endangered
FP: fully protected
PT: proposed threatened
SSC: species of special concern
T: threatened
WL: watch list
ESU: evolutionarily significant unit

2. Species Heritage rank as assigned by California Department of Fish and Wildlife (CDFW)

G1/S1: critically imperiled
G2/S2: imperiled
G3/S3: vulnerable
G4/S4: apparently secure
G5/S5: secure

Table A-2
Regionally Occurring Special Status Animal Species Scoping List CNDDB, IPaC
Royal Gold Biological Survey

Scientific Name	Common Name	Fedlist	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Amphibians									
Ascaphus truei	Pacific tailed frog	None	None		SSC	Aquatic, Klamath/ N. coast flowing waters, Lower montane conifer, N. coast conifer, Redwood, and Riparian forests	Occurs in montane hardwood-conifer, redwood, Douglas-fir & ponderosa pine habitats.	Restricted to perennial montane streams. Tadpoles require water below 15 degrees C.	None
Plethodon elongatus	Del Norte salamander	None	None		WL	Old-growth associated species with optimum conditions in the mixed conifer/hardwood ancient forest ecosystem.	Oldgrowth.	Cool, moist, stable micro-climate, deep litter layer, closed multi-storied canopy, dominant large, old trees.	None
Rana aurora	northern red-legged frog	None	None	G4	SSC	Klamath/North coast flowing waters | Riparian forest | Riparian woodland	Humid forests, woodlands, grasslands, & streamsides in northwestern California, usually near dense riparian cover.	Generally near permanent water, but can be found far from water, in damp woods and meadows, during non-breeding season.	High
Rana boylii	foothill yellow-legged frog	None	None	G3	SSC	Aquatic, Chaparral, Cismontane woodland, Coastal scrub, Klamath/N. coast flowing waters, Lower montane conifer forest, Meadow & seep, Riparian forest & woodland	Partly-shaded, shallow streams & riffles with a rocky substrate in a variety of habitats.	Need at least some cobble-sized substrate for egg-laying. Need at least 15 weeks to attain metamorphosis.	None
Rhyacotriton variegatus	southern torrent salamander	None	None	G3G4	SSC	Lower montane conifer forest, Oldgrowth, Redwood, Riparian forest	Coastal redwood, Douglas-fir, mixed conifer, montane riparian, and montane hardwood-conifer habitats. Old growth forest.	Cold, well-shaded, permanent streams and seepages, or within splash zone or on moss-covered rock within trickling water.	None
Birds									
Accipiter cooperii	Cooper's hawk	None	None	G5	WL	Cismontane woodland Riparian forest Riparian woodland Upper montane conifer forest	Woodland, chiefly of open, interrupted or marginal type.	Nest sites mainly in riparian deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	Moderate
Ardea alba	great egret	None	None	G5	-	Brackish marsh, estuary, freshwater marsh, marsh & swamp, riparian forest, wetland	Colonial nester in large trees.	Rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes.	Moderate

Scientific Name	Common Name	Fedlist	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Ardea herodias	great blue heron	None	None	G5	-	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland	Colonial nester in tall trees, cliffsides, and sequestered spots on marshes.	Rookery sites in close proximity to foraging areas: marshes, lake margins, tide-flats, rivers and streams, wet meadows.	Moderate
Brachyramphus marmoratus	marbled murrelet	T	E	G3G4		Lower montane conifer forest, Oldgrowth Redwood	Feeds near-shore; nests inland along coast from Eureka to Oregon border.	Nests in old-growth redwood-dominated forests, up to 6 mi. inland, often in Douglas-fir.	Low (flyover)
Cerorhinca monocerata	rhinoceros auklet	None	None		WL	Spends the majority of its life in the open ocean and along coastlines.	Off-shore islands and rocks along the California coast.	Nests in a burrow on undisturbed, forested and unforested islands, and probably in cliff caves on the mainland.	None
Charadrius alexandrinus nivosus	western snowy plover	T	None	G3T3	SSC	Great Basin standing waters, Sand shore, Wetland	Sandy beaches, salt pond levees & shores of large alkali lakes.	Needs sandy, gravelly or friable soils for nesting.	None
Charadrius montanus	mountain plover	None	None	G3	SSC	Chenopod scrub Valley & foothill grassland	Short grasslands, freshly plowed fields, newly sprouting grain fields, & sometimes sod farms.	Short vegetation, bare ground & flat topography. Prefers grazed areas & areas with burrowing rodents.	None
Circus cyaneus	northern harrier	None	None	G5	SSC	Coastal scrub Great Basin grassland Marsh & swamp Riparian scrub	Coastal salt & fresh-water marsh. Nest & forage in grasslands, from salt grass in desert sink to mountain cienagas.	Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	Low
Coccyzus americanus occidentalis	western yellow-billed cuckoo	T	E	G5T2T3	S1	Riparian forest	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems.	Nests in riparian jungles of willow, often mixed with cottonwoods, w/ lower story of blackberry, nettles, or wild grape.	None
Egretta thula	snowy egret	None	None	G5	-	Marsh & swamp, Meadow & seep, Riparian forest, Riparian woodland, Wetland	Colonial nester, with nest sites situated in protected beds of dense tules.	Rookery sites situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, & borders of lakes.	None
Elanus leucurus	white-tailed kite	None	None	G5	FP	Cismontane woodland | Marsh & swamp | Riparian woodland | Valley & foothill grassland | Wetland	Rolling foothills and valley margins with scattered oaks & river bottomlands or marshes next to deciduous woodland.	Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Low

Scientific Name	Common Name	Fedlist	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Empidonax traillii	willow flycatcher	None	E	G5	-	Meadow & seep Riparian scrub Riparian woodland Wetland	Inhabits extensive thickets of low, dense willows on edge of wet meadows, ponds, or backwaters; 2000-8000 ft elevation	Requires dense willow thickets for nesting/roosting. Low, exposed branches are used for singing posts/hunting perches.	None
Falco columbarius	merlin	None	None	G5	WL	Estuary Great Basin grassland Valley & foothill grassland	Seacoast, tidal estuaries, open woodlands, savannahs, edges of grasslands & deserts, farms & ranches.	Clumps of trees or windbreaks are required for roosting in open country.	Low
Falco peregrinus anatum	American peregrine falcon	D	D	G4T4	FP	Feed exclusively on smaller bird species. Wide variety of habitats across the globe.	Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures.	Nest consists of a scrape or a depression or ledge in an open site.	Moderate
Fratercula cirrhata	tufted puffin	None	None	G5	SSC	Protected deepwater coastal communities	Open-ocean bird; nests along the coast on islands, islets, or (rarely) mainland cliffs.	Requires sod or earth into which the birds can burrow, on island cliffs or grassy island slopes.	None
Haematopus bachmani	black oystercatcher	None	None	G5	S4	Rocky seacoasts and islands, less commonly sandy beaches.	Breeds on undisturbed, rocky, open ocean shores.	Nesting ledges must be available beyond the reach of ocean waves, & inaccessible to terrestrial predators.	None
Haliaeetus leucocephalus	bald eagle	D	E	G5	FP	Lower montane coniferous forest Oldgrowth	Ocean shore, lake margins, & rivers for both nesting & wintering. Most nests within 1 mi of water.	Nests in large, old-growth, or dominant live tree w/open branches, especially ponderosa pine. Roosts communally in winter.	Low
Icteria virens	yellow-breasted chat	None	None	G5	SSC	Riparian forest riparian scrub, riparian woodland	Summer resident; inhabits riparian thickets of willow & other brushy tangles near watercourses.	Nests in low, dense riparian, consisting of willow, black-berry, wild grape; forages and nests within 10 ft of ground.	Low
Numenius americanus	long-billed curlew	None	None	G5	WL	Great Basin grassland Meadow & seep	Breeds in upland shortgrass prairies & wet meadows in northeastern California.	Habitats on gravelly soils and gently rolling terrain are favored over others.	None
Nycticorax nycticorax	black-crowned night heron	None	None	G5	-	Marsh & swamp, Riparian forest, Riparian woodland, Wetland	Colonial nester, usually in trees, occasionally in tule patches.	Rookeries adjacent to forage areas: lake margins, mud-bordered bays, marshy spots.	None
Oceanodroma furcata	fork-tailed storm-petrel	None	None	G5	SSC	Protected deepwater coastal communities	Colonial nester on small, offshore islets. Forages over the open ocean, usually well off-shore.	Birds choose off-shore islets which provide nesting crannies beneath rocks or sod for burrowing.	None

Scientific Name	Common Name	Fedlist	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Pandion haliaetus	osprey	None	None	G5	WL	Riparian forest	Ocean shore, bays, fresh-water lakes, and larger streams.	Large nests built in tree-tops within 15 miles of a good fish-producing body of water.	Moderate
Pelecanus occidentalis californicus	California brown pelican	D	D	G4T3	FP	Rests on piers, sandbars, pilings, jetties, breakwaters and offshore rocks when not nesting or feeding.	Colonial nester on coastal islands just outside the surf line.	Nests on coastal islands of small to moderate size which afford immunity from ground-dwelling predators. Roosts communally.	None
Phalacrocorax auritus	double-crested cormorant	None	None	G5	WL	Riparian forest | Riparian scrub | Riparian woodland	Colonial nester on coastal cliffs, offshore islands, & along lake margins in the interior of the state.	Nests along coast on sequestered islets, usually on ground with sloping surface, or in tall trees along lake margins.	None
Poecile atricapillus	black-capped chickadee	None	None	G5	WL	Riparian woodland	Inhabits riparian woodlands in Del Norte and northern Humboldt counties.	Mainly found in deciduous tree-types, especially willows and alders, along large or small watercourses.	High
Ptychoramphus aleuticus	Cassin's auklet	None	None	G4	SSC	Open ocean for feeding.	Offshore islands with enough soil for burrowing. Will also nest in rock crevices, under buildings & in debris.	Uses burrows for nesting, vulnerable to predation, travels to and from the nest during the night.	None
Rallus longirostris obsoletus	California clapper rail	E	E	G5T1	FP	Brackish marsh Marsh & swamp Salt marsh Wetland	Salt-water & brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay.	Associated with abundant growths of pickleweed, but feeds away from cover on invertebrates from mud-bottomed sloughs.	None
Riparia riparia	bank swallow	None	T	G5	-	Riparian scrub, Riparian woodland	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert.	Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	None
Setophaga petechia	yellow warbler	None	None	G5	SSC	Riparian forest, riparian scrub, riparian woodland	Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in Cascades and Sierra Nevada.	Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	Moderate
Strix nebulosa	great gray owl	None	E	G5	-	Lower montane conifer forest, oldgrowth, Subalpine conifer forest, upper montane conifer forest.	Resident of mixed conifer or red fir forest habitat, in or on edge of meadows.	Needs large diameter snags in a forest with high canopy closure, which provide a cool sub-canopy microclimate.	Low

Scientific Name	Common Name	Fedlist	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Strix occidentalis caurina	northern spotted owl	T	T	G3T3	SSC	North coast coniferous forest, Oldgrowth Redwood	Old-growth forests or mixed stands of old-growth & mature trees. Occasional in younger forests w/ patches of big trees.	High, multistory canopy dominated by big trees, many trees w/cavities or broken tops, woody debris & space under canopy.	None
Fish									
Acipenser medirostris	green sturgeon	T	None	G3	SSC	Aquatic | Klamath/North coast flowing waters | Sacramento/San Joaquin flowing waters	These are the most marine species of sturgeon. Abundance increases northward of Point Conception. Spawns in the Sacramento, Klamath, & Trinity Rivers.	Spawns at temps between 8-14 C. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	None
Entosphenus tridentatus	Pacific lamprey	None	None	G4	SSC	Aquatic, Klamath/North coast flowing waters Sacramento/San Joaquin flowing waters South coast flowing waters	Found in Pacific Coast streams north of San Luis Obispo Co., however regular runs in Santa Clara River. Size of runs is declining.	Swift-current gravel-bottomed areas for spawning with water temps between 12-18 C. Ammocoetes need soft sand or mud.	None
Eucyclogobius newberryi	tidewater goby	E	None	G3	SSC	Aquatic, Klamath/North coast flowing waters, Sacramento/ San Joaquin flowing waters, South coast flowing waters	Brackish water habitats along the Calif coast from Agua Hedionda Lagoon, San Diego Co. to the mouth of the Smith River.	Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water & high oxygen levels.	None
Oncorhynchus clarkii clarkii	coast cutthroat trout	None	None	G4T4	SSC	Aquatic, Klamath/North coast flowing waters	Small coastal streams from the Eel River to the Oregon border.	Small, low gradient coastal streams & estuaries. Need shaded streams with water temps <18C, & small gravel for spawning	None
Oncorhynchus kisutch	coho salmon - southern Oregon / northern California ESU	T	T	G4T2Q	-	Aquatic, Klamath/North coast flowing waters, Sacramento/ San Joaquin flowing waters.	Fed listing refers to populations between Cape Blanco, Oregon & Punta Gorda, Humboldt County, California.	State listing refers to populations between the Oregon border & Punta Gorda, California.	None
Oncorhynchus mykiss irideus	steelhead - northern California DPS	T	None	G5T2-T3Q	-	Aquatic Klamath/North coast flowing waters	Streams between Elk River, Oregon and the Klamath & Trinity rivers in California, inclusive.	Minimum water depth for upstream migration is 18 cm. Water velocities > 3-4 m/sec may impede upstream progress.	None

Scientific Name	Common Name	Fedlist	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Oncorhynchus tshawytscha	chinook salmon - upper Klamath and Trinity Rivers ESU.	None	None	G5	SSC	Aquatic Sacramento/San Joaquin flowing waters	Federal listing refers to wild spawned, coastal, spring & fall runs between Redwood Cr, Humboldt Co & Russian R., Sonoma Co	Major limiting factor for juvenile chinook salmon is temperature, which strongly effects growth & survival.	None
Spirinchus thaleichthys	longfin smelt	C	T	G5	SSC	Aquatic | Estuary	Euryhaline, nektonic & anadromous. Open waters of estuaries, mostly mid to bottom of water column.	Prefer salinities of 15-30 ppt, but can be found in completely freshwater to almost pure seawater.	None
Thaleichthys pacificus	eulachon	T	None	G5	-	Aquatic Klamath/North coast flowing waters	Found in Klamath River, Mad River, Redwood Creek & in small numbers in Smith River & Humboldt Bay tributaries.	Spawn in lower reaches of coastal rivers w/ mod. water velocity. Bottom of pea-sized gravel, sand & woody debris	None
Insects									
Bombus caliginosus	obscure bumble bee	None	None	G4?	-	Nests underground or above ground in abandoned bird nests	Open grassy coastal plains and coast range meadows from Santa Barbara county to Washington state.	Food plant genera include Baccharis, Cirsium, Lupinus, Lotus, Grindelia and Phacelia.	Low
Bombus occidentalis	western bumble bee	None	None	G2G3	-	Pollinate a wide variety of flowers. Will gnaw through flowers to obtain nectar their tongues are too short to reach.	Once common & widespread, species has declined precipitously from central CA to southern B.C., perhaps from disease.	Nest in cavities or abandoned burrows	Low
Cicindela hirticollis gravida	sandy beach tiger beetle	None	None	G5T2	-	Coastal dunes	Inhabits areas adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico.	Clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sand not affected by wave action.	None
Mammals									
Arborimus albipes	white-footed vole	None	None		SSC	North coast conifer forest, Redwood, riparian forest	Mature coastal forests in Humboldt & Del Norte cos. Prefers areas near small, clear streams with dense alder & shrubs.	Occupies the habitat from the ground surface to the canopy. Feeds in all layers & nests on the ground under logs or rock	Low
Arborimus pomo	Sonoma tree vole	None	None	G3	SSC	North coast coniferous forest, Oldgrowth, Redwood	North coast fog belt from Oregon border to Sonoma Co. In Douglas-fir, redwood & montane hardwood-conifer forests.	Feeds almost exclusively on Douglas-fir needles. Will occasionally take needles of grand fir, hemlock or spruce.	None

Scientific Name	Common Name	Fedlist	CalList	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Corynorhinus townsendii	Townsend's big-eared bat	None	None	G3G4	SSC	Broadleaf upland forest, seep & meadow, Chaparral, upper & low montane conifer forest, riparian forest & woodland, valley & foothill grassland	Throughout California in a wide variety of habitats. Most common in mesic sites.	Roosts in the open, hanging from walls & ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	None
Myotis evotis	long-eared myotis	None	None	G5	-	Roosts in a wide range of substrate.	Found in all brush, woodland & forest habitats from 0 ft to about 9000 ft. prefers conifer woodland & forest.	Nursery colonies in buildings, crevices, spaces under bark, & snags. Caves used primarily as night roosts.	Low
Pekania pennanti	fisher - West Coast DPS	PT	CT	G5T2-T3Q	SSC	North coast coniferous forest, Oldgrowth, Riparian forest	Intermediate to large-tree stages of conifer forests & deciduous-riparian areas with high % canopy closure.	Uses cavities, snags, logs & rocky areas for cover & denning. Needs large areas of mature, dense forest.	None
Mollusks									
Margaritifera falcata	western pearlshell	None	None		-	Aquatic.	Aquatic.	Prefers lower velocity waters.	None
Reptiles									
Emys marmorata	western pond turtle	None	None		SSC	Aquatic, Artificial flowing waters, Klamath/N. coast flowing waters, Klamath/N. coast standing waters, Marsh & swamp, Wetland	A thoroughly aquatic turtle of ponds, marshes, rivers, streams & irrigation ditches, usually with aquatic vegetation, below 6000 ft.	Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	None

1. Species indicator status as assigned by Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and California Department of Fish and Wildlife (CDFW)

C: candidate
CT: candidate threatened
D: delisted
DPS: distinct population segment
E: endangered
ESU: evolutionarily significant unit
FP: fully protected
PT: proposed threatened
SSC: species of special concern
T: threatened
WL: watch list
FP: fully protected

2. Species Heritage rank as assigned by California Department of Fish and Wildlife (CDFW)

G1/S1: critically imperiled
G2/S2: imperiled
G3/S3: vulnerable
G4/S4: apparently secure
G5/S5: secure

Table A-3 Botanical Species Observed 1/17/17, 1/25/17, 7/27/2017 Royal Gold			
Scientific Name	**Common Name**	**Family**	**Native?**
Trees			
Abies grandis	grand fir	Pinaceae	Y
Alnus rubra	red alder	Betulaceae	Y
Frangula purshiana	cascara	Rhamnaceae	Y
Hesperocyparis macrocarpa	Monterrey cypress	Cupressaceae	N
Ilex aquifolium	English holly	Aquifoliaceae	N
Notholithocarpus densiflorus	tanoak	Fagaceae	Y
Picea sitchensis	Sitka spruce	Pinaceae	Y
Pinus radicata	Monterrey pine	Pinaceae	N
Pseudotsuga menziesii	Douglas fir	Pinaceae	Y
Pyrus communis	flowering pear	Rosaceae	N
Salix lasiandra	pacific willow	Salicaceae	Y
Salix lasiolepis	arroyo willow	Salicaceae	Y
Sequoia sempervirens	coast redwood	Cupressaceae	Y
Umbellularia californica	California bay tree	Lauraceae	N
Shrubs			
Baccharis pilularis	coyote brush	Asteraceae	Y
Ceanothus thyrsiflorus	blueblossom	Rhamnaceae	Y
Cotoneaster lacteus	milkflower cotoneaster	Rosaceae	N
Cytisus scoparius	Scotch broom	Fabaceae	N
Genista monspessulana	French broom	Fabaceae	N
Morella californica	California wax myrtle	Myricaceae	Y
Rosa cultivar	rose cultivar	Rosaceae	N
Rubus armeniacus	Himalayan blackberry	Rosaceae	N
Rubus ursinus	California blackberry	Rosaceae	Y
Sambucus racemosa	red elderberry	Adoxaceae	Y
Ferns and Allies			
Athyrium filix-femina	lady fern	Woodsiaceae	Y
Equisetum arvense	horsetail	Equisetaceae	Y
Polystichum munitum	sword fern	Dryopteridaceae	Y
Pteridium aquilinum	bracken fern	Dennstaedtiaceae	Y
Sedges and Rushes			
Carex leptopoda	slender footed sedge	Cyperaceae	Y
Cyperus eragrostis	three cornered sedge	Cyperaceae	Y
Eleocharis acicularis	needle spikerush	Cyperaceae	Y
Eleocharis macrostachya	common spikerush	Cyperaceae	Y
Isolepis cernua	low clubrush	Cyperaceae	Y
Juncus bolanderi	Bolander's rush	Cyperaceae	Y
Juncus bufonius	toad rush	Juncaceae	Y
Juncus effuses	common rush	Juncaceae	Y
Juncus ensifolius	swordleaf rush	Juncaceae	Y
Juncus occidentalis	western rush	Juncaceae	Y
Juncus patens	spreading rush	Juncaceae	Y
Scirpus microcarpus	panicled bulrush	Cyperaceae	Y
Grasses			
Agrostis exarata	spike bentgrass	Poaceae	Y

Table A-3 Botanical Species Observed 1/17/17, 1/25/17, 7/27/2017 Royal Gold			
Scientific Name	**Common Name**	**Family**	**Native?**
Agrostis stolonifera	creeping bentgrass	Poaceae	Y
Aira caryophyllea	silver hairgrass	Poaceae	N
Alopecurus geniculatus	marsh foxtail	Poaceae	Y
Alopecurus pratensis	meadow foxtail	Poaceae	N
Anthoxanthum odoratum	sweet vernal grass	Poaceae	N
Avena barbata	slender wildoat	Poaceae	N
Beckmannia syzigachne	slough grass	Poaceae	Y
Briza maxima	large quaking grass	Poaceae	N
Briza minor	small quaking grass	Poaceae	N
Bromus carinatus	California brome	Poaceae	Y
Cortaderia selloana	pampus grass	Poaceae	N
Cynosurus echinatus	bristly dogtail grass	Poaceae	N
Festuca arundinacea	tall fescue	Poaceae	N
Festuca bromoides	brome fescue	Poaceae	N
Festuca perennis	Italian ryegrass	Poaceae	N
Glceria declinata	manna grass	Poaceae	N
Holcus lanatus	velvet grass	Poaceae	N
Hordeum vulgare	common barley	Poaceae	N
Phalaris arundinacea	canary reedgrass	Poaceae	N
Poa annua	annual grass	Poaceae	N
Poa pratensis	Kentucky blugrass	Poaceae	N
Polypogon maritimus	rabbits-foot grass	Poaceae	N
Herbs			
Acmispon parviflorus	hill lotus	Fabaceae	Y
Alisma triviale **possibly *lanceolatum***	water plantain	Alismataceae	Y
Anaphalis margaritacea	pearly everlasting	Asteraceae	Y
Anisocarpus madioides	woodland madia	Asteraceae	Y
Bidens frondosa	devil's beggartick	Asteraceae	Y
Chamerion angustifolium	fireweed	Onagraceae	Y
Cirsium vulgare	bull thistle	Asteraceae	N
Conium maculatum	poison hemlock	Apiaceae	N
Daucus carota	Queen Anne's lace	Apiaceae	N
Dipsacus fullonum	wild teasel	Asteraceae	N
Epilobium ciliatum	fringed willowherb	Onagraceae	Y
Erigeron canadensis	Canada horseweed	Asteraceae	Y
Foeniculum vulgare	fennel	Apiaceae	N
Galium aparine	cleaver plant	Rubiaceae	Y
Geranium dissectum	cutleaf geranium	Geraniaceae	N
Geranium robertianum	Robert's geranium	Geraniaceae	N
Helminthotheca echioides	bristly ox-tongue	Asteraceae	N
Hypochaeris radicata	hairy cat's-ear	Asteraceae	N
Iris douglasiana	Douglas iris	Iridaceae	Y
Lapsana communis	nipplewort	Asteraceae	N
Lathyrus latifolius	perennial sweetpea	Fabaceae	N
Linum bienne	flax	Linaceae	N
Lotus corniculatus	bird's-foot trefoil	Fabaceae	N
Ludwigia hexapetala	six-petal waterprimrose	Onagraceae	**N**
Lupinus species	lupine (not Id'd)	Fabaceae	?

Table A-3 Botanical Species Observed 1/17/17, 1/25/17, 7/27/2017 Royal Gold			
Scientific Name	**Common Name**	**Family**	**Native?**
Madia exigua	little tarweed	Asteraceae	Y
Medicago polymorpha	bur clover	Fabaceae	N
Melilotus albus	white sweetclover	Fabaceae	N
Melilotus indicus	annual yellow sweetclver	Fabaceae	N
Mentha pulegium	pennyroyal	Lamiaceae	N
Parentucellia viscosa	yellow glandweed	Orobanchaceae	N
Persicaria maculosa	spotted ladysthumb	Polygonaceae	N
Polygonum aviculare	prostrate knotweed	Polygonaceae	N
Prunella vulgaris	common selfheal	Lamiaceae	Y
Ranunculus repens	creeping buttercup	Ranunculaceae	N
Raphanus sativa	wild radish	Onagraceae	N
Rumex crispus	curly dock	Polygonaceae	N
Senecio minimus	coastal burnweed	Asteraceae	N
Silybum marianum	blessed milkthistle	Asteraceae	N
Sonchus asper	prickly sow thistle	Asteraceae	N
Spergula arvensis	corn spurry	Caryophyllaceae	N
Stachys ajugoides	bugle hedgenettle	Lamiaceae	Y
Symphyotrichum chilense	pacific aster	Asteraceae	Y
Torilis arvensis	spreading hedge parsley	Apiaceae	N
Trifolium arvense	rabbitfoot clover	Fabaceae	N
Trifolium dubium	shamrock clover	Fabaceae	N
Trifolium pratense	red clover	Fabaceae	N
Trifolium hybridum	alsike clover	Fabaceae	N
Trifolium repens	white clover	Fabaceae	N
Typha latifolia	broadleaf cattail	Typhaceae	Y
Veronica americana	American speedwell	Plantaginaceae	Y
Vicia hirsuta	tiny vetch	Fabaceae	N
Vicia sativa	spring vetch	Fabaceae	N
Vicia villosa	hairy vetch	Fabaceae	N
Zeltnera muehlenbergii	Muehlenberg's centaury	Gentianaceae	Y
120 Species			**45% Native**

Table A-4 Animal Species Observed 1/17/17, 1/25/17, 7/27/2017 Royal Gold				
Scientific Name	**Common Name**	**Family**	**Nesting Habit**	**Listed?**
Amphibians				
Dicamptodon tenebrosus	coast giant salamander	Dicamptodontidae	N/A	
Pseudacris regilla	pacific chorus frog	Hylidae	N/A	NL
Birds				
Anas platyrhynchos	mallard	Anatidae	On dry land near standing water in thick vegetation.	NL
Bombycilla cedrorum	cedar waxwing	Bombycillidae	Fork of a horizontal branch, 3-50 ft high	NL
Branta canadensis	Canada geese	Anatidae	On the ground, elevated near water.	NL
Buteo jamaicensis	red-tailed hawk	Accipitridae	High in canopy of a large tree with a view.	NL
Callipepla californica	California quail	Odontophoridae	Hides nest on the ground amid grasses, shrubs.	NL
Calypte anna	Anna's hummingbird	Trochilidae	Horizontal branches, open woodlands	NL
Cardellina pusilla	Wilson's warbler	Parulidae	small depression on ground, base of tree/object	NL
Cathartes aura	turkey vulture	Cathartidae	Rock crevices, caves, ledges, thickets, etc.	NL
Chamaea fasciata	wrentit	Paradoxornithidae	In dense vegetation, 1-9 feet high.	NL
Colaptes auratus	northern flicker	Picidae	Cavity in diseased/ dead trees 10-15 ft up.	NL
Corvus brachyrhynchos	American crow	Corvidae	In tree canopy, March-July	NL
Corvus corax	raven	Corvidae	Cliffs, trees, and structures	NL
Cyanocitta stelleri	stellar jay	Corvidae	Nests in conifers, near the top of trees	NL
Junco hyemalis	dark-eyed junco	Emberizidae	On ground, in niche, notch, rock face, roots.	NL
Passer domesticus	house sparrow	Passeridae	In holes of buildings and structures.	NL
Picoides pubescens	downy woodpecker	Picidae	Excavate cavities within dead trees	NL
Poecile rufescens	chestnut backed chickadee	Paridae	Cavity nester, variety of woodland sites	NL
Psaltriparus minimus	bush tit	Aegithalidae	hanging nest on branches or trees, 3-100 feet high.	NL
Sayornis nigricans	black phoebe	Tyrannidae	Mud shell on vertical surface, with overhang	NL
Sphyrapicus ruber	red-breasted sapsucker	Picidae	Cavity within dead tree, coniferous forests.	NL
Streptopelia decaocto	Eurasian dove	Columbidae	Trees and buildings	NL
Sturnis vulgaris	European starling	Sturnidae	Cavity, near human habitation	NL
Tachycineta bicolor	tree swallow	Hirundinidae	Cavities of standing dead trees	NL
Troglodytes aedon	house wren	Troglodytidae	cavity nester in wide range of locations	NL
Troglodytes pacificus	pacific wren	Troglodytidae	Domed nest often near streams,	NL
Turdus migratorius	American robin	Turdidae	Within lower canopy, April-July	NL
Vireo huttoni	Hutton's vireo	Vireonidae	Within tree canopy, near end of branch.	NL
Insects				
Aquarius remigis	water strider	Gerridae	N/A	NL

Culcidae sp.	mosquitos	Culcidae	N/A	NL
Vespula pensylvanica	western yellow-jacket	Vespidae	ground burrow	NL

Table A-4
Animal Species Observed 1/17/17, 1/25/17, 7/27/2017
Royal Gold

Scientific Name	Common Name	Family	Nesting Habit	Listed?
Mammals				
Cervus canadensis roosevelti	Roosevelt elk	Cervidae	N/A	NL
Felis catus	house cat	Felidae	N/A	NL
Odocoileus hemionus columbianus	Columbian black-tailed deer	Cervidae	N/A	NL
Peromyscus maniculatus	deer mouse	Cricetidae	N/A	NL
Procyon lotor psora	California raccoon	Procyonidae	N/A	NL

B

Site Photographs

Photo 1. Looking West across northern portion of the project area. Note tire tracks, and disturbed nature of the site. January site visit followed heavy rains and flooding the preceding week. Photo taken January 24, 2017.

Photo 2. Looking south across the project area. Note soil piles and soil disturbance. Photo taken January 24, 2017.

Photo 3. Looking east across the project area. Note Soil piles and lack of vegetation in foreground. Photo taken January 24, 2017.

Photo 4. Looking south over the northwestern portion of the project area. Note shrubby sapling growth in background. To be protected with 50 foot setback. Photo taken January 17, 2017.

Photo 5. Eastern border of project area. Note developing red alder canopy. Tall fescue grassland in foreground with pampas grass and *Juncus effuses* clumps near edge of shrubs. Red alder saplings and drainage to be protected with 50 foot setback. Photo taken January 24, 2017.

Photo 6. Drainage way to detention basin within project area. Note industrial equipment and paved areas in background. Photo taken January 25, 2017.

Historic Aerial Photos

2003 Royal Gold Aerial

2004 Royal Gold Aerial

2006 Royal Gold Aerial

2009 Royal Gold Aerial

2010 Royal Gold Aerial

2011 Royal Gold Aerial

2012 Royal Gold Aerial

2014 Royal Gold Aerial

2016 Royal Gold Aerial

Wetland and Other Waters Delineation Report - Final

5.6

Wetland and Other Waters Delineation Report - Final

Royal Gold LLC

Glendale, California

Prepared for:

Chad Waters

May 2018
016098

Reference: 016098

Wetland and Other Waters Delineation Report – Final

Royal Gold LLC
Glendale, California

Prepared for:
Chad Waters

Prepared by:

1062 G Street, Suite I
Arcata, CA 95521
707-822-5785

May 2018

QA/QC:SJP

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Appendices

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Tables

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Abbreviations and Acronyms

APN	Assessor's parcel number
CFR	Code of Federal Regulations
CT	control point
CWA	Clean Water Act
DI	drainage inlet
EPA	United States Environmental Protection Agency
FAC	facultative wetland plant species
FACU	facultative-upland wetland plant species
FACW	facultative-wet wetland plant species
GIS	geographic information system
GPS	global positioning system
N/A	not applicable
NL	not listed plant species
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	obligate wetland plant species
OHWM	ordinary high water mark
PEM	Palustrine emergent
QISP	Qualified Industrial Stormwater Practioner
Redox	redoximorphic
RWQCB	California Regional Water Quality Control Board
SHN	SHN Engineers & Geologists
SWRCB	State Water Resources Control Board
TP	test pit
UPL	upland wetland plant species
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey
WDRs	waste discharge requirements
WETS	Climate Analysis for Wetlands Tables
WoS	waters of the State
WoUS	waters of the United States

1.0 Introduction

SHN Engineers & Geologists (SHN) has prepared this preliminary jurisdictional wetland delineation for Royal Gold. Fieldwork was performed by SHN staff.

1.1 Purpose

The purpose of this report is to identify potential jurisdictional wetlands and other waters of the United States and State at the project site, as defined by the United States Army Corps of Engineers (USACE) methodology. The delineation of these features will help guide the design and construction of future development within the study area and avoid impacts to potential jurisdictional wetlands.

1.2 Project Location

The project is located in Glendale, California, an unincorporated community within Humboldt County (Figure 1; United States Geological Survey [USGS] Arcata North 7.5-minute Quadrangle, Township 6 North, Range 1 east, Section 13, Humboldt Meridian). The project is located on 15 adjacent parcels, with an approximate total of 43.4 acres. The wetland delineation study area took place on six of the parcels (Assessor's parcel numbers [APNs] 516-111-062, 516-101-017, 040, 064, 068, and 084.) with a total of 27.8 acres, and a central location at latitude and longitude 40.902744° and -124.019677° (County of Humboldt GIS, 2017). The remainder (15.6 acres) is the center of industrial operations, and contains numerous stormwater features recently created to address stormwater runoff. This area was traversed and stormwater features were noted, however no wetland areas were observed during the walk through, and no test pits were excavated. The wetland delineation was approximately 600 feet northeast of US Hwy 101 at its nearest point, and approximately 1,500 feet north of the Mad River at its nearest point.

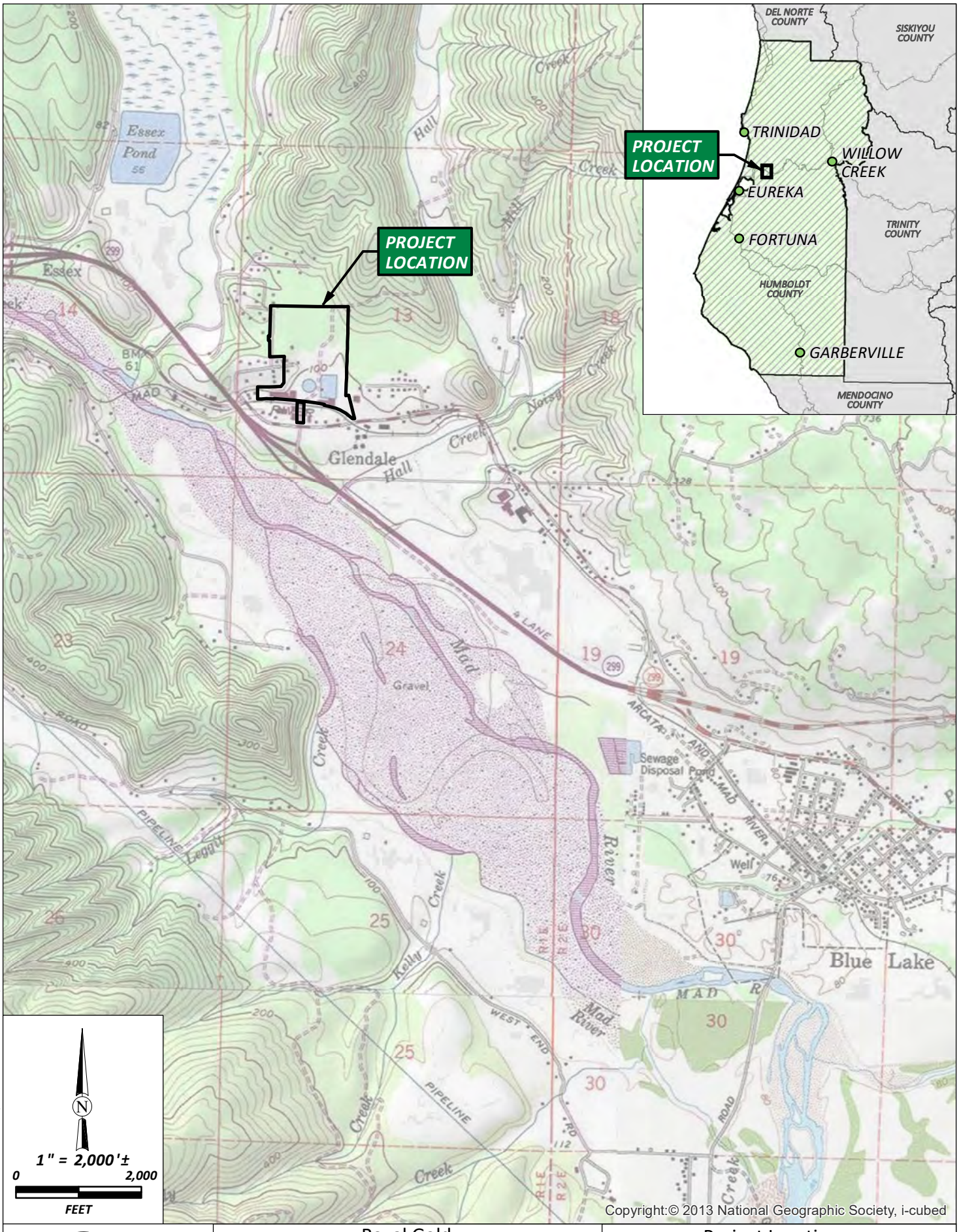
2.0 Project Description

Environmental management constraints are being considered for the study area. This report will assist in considering site management options. During the January 2017 field visits, preliminary wetland and OHWM boundaries were established. A pattern was established between hydric soils, vegetation, and hydrology in a portion of the study area; changes in hydrology, vegetation, and exploratory soil probing were used to further delineate the boundaries of other similar wetlands in the near vicinity. The follow-up February 9, 2018 field work was used to supplement the initial investigation and further resolve the wetland and OHWM boundaries.

3.0 Environmental Setting

3.1 Site Uses

The study area is situated at an approximate 120-foot elevation above mean sea level (See Figures 1, 2, and 3, and Appendix 1). The study area has been used for industrial purposes since the 1950s. Two lumber mills operated on the site under different owners until 2002, when the last owner filed for bankruptcy and a large portion of the mill was torn down. Subsequently, a greenwaste recycling and composting company occupied the site. In 2009, the current occupant, Royal Gold, moved onto the site for the processing, production, and shipping of their soil products. Currently, the southern portion of the project area is the location of the soil processing facilities, including structures covering the processing facilities and concrete pads left from the mill. The majority of the wetland delineation area is vacant, with adjacent bulk storage of



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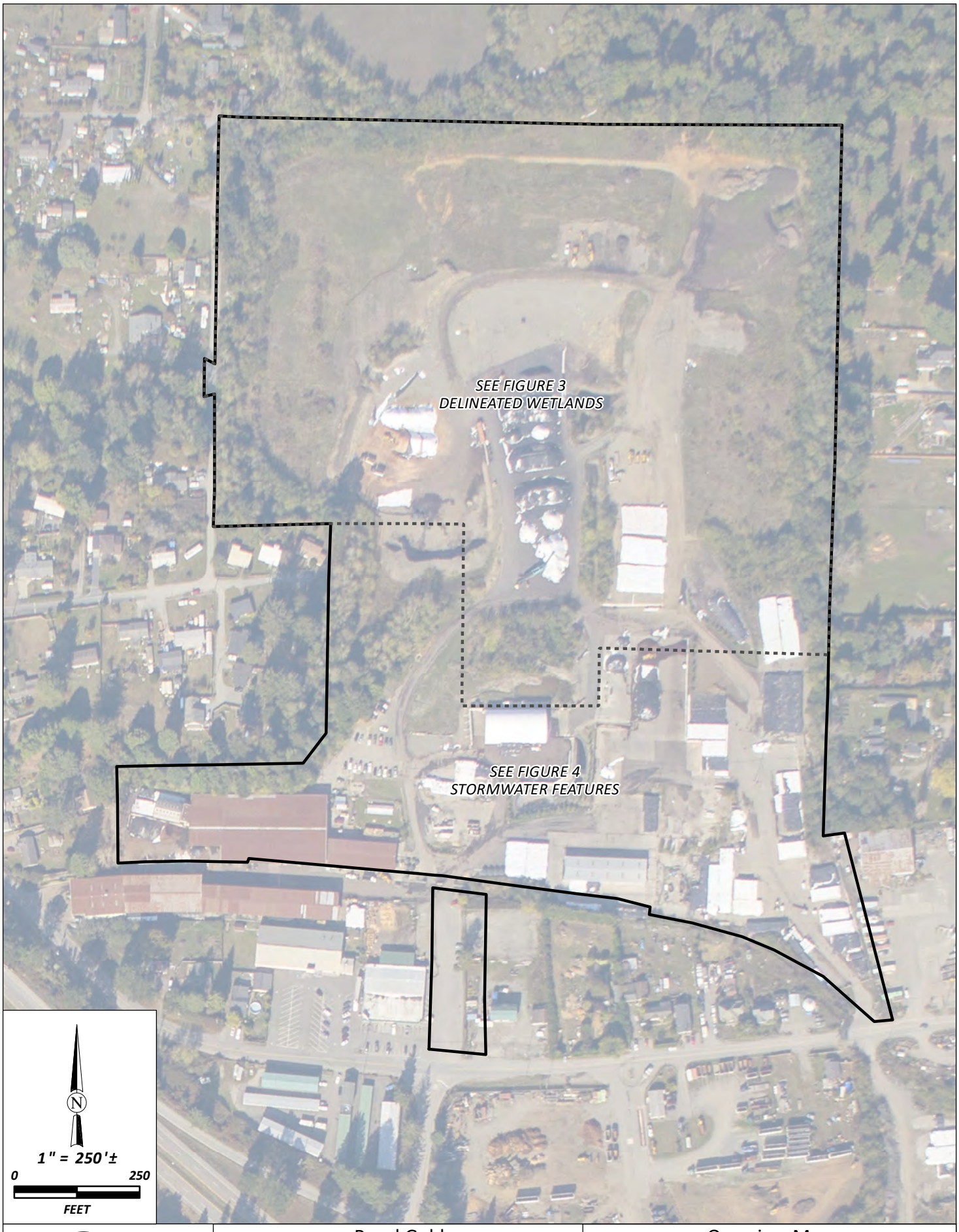
Consulting Engineers & Geologists, Inc.

Royal Gold
Wetland & Other Waters Delineation
Glendale, Humboldt County, California

Project Location

SHN 016098.006

March 2018 | WD2_Fig1_ProjectLocation | Figure 1



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SHN Consulting Engineers & Geologists, Inc.	Royal Gold Wetland & Other Waters Delineation Glendale, Humboldt County, California	Overview Map SHN 016098.006
	March 2018 | WD2_Fig2_Overview	Figure 2

Lat: 40.904486
Long: -124.022949

OHWM #1
0.33 AC.
607 LINEAR FT.

OHWM-PT1

WETLAND #1
1.40 AC.

DI

TP20U
TP8U
TP9U
TP10U
TP4U
TP5W
TP1U
TP3U
TP11U
TP5U
TP2U
TP24U
TP12U
TP6U
TP6W
TP7U
TP14U
TP13W
TP19U
TP18U
TP22W
TP15W
TP17U
TP16W

STORMWATER
RETENTION
BASINS
(CONSTRUCTED)

WETLAND #2
1.17 AC.

STORMWATER
OVERFLOW
CONVEYANCE
FEATURE

WETLAND #3
0.29 AC.

STORMWATER
RETENTION
BASIN
(CONSTRUCTED)

SEE FIGURE 4
STORMWATER FEATURES

Lat: 40.901205
Long: -124.016283

258
257
257
185

EXPLANATION

- WETLAND TEST PIT
- UPLAND TEST PIT
- OHWM POINT
- DRAINAGE DIRECTION
- WETLAND BOUNDARY
- WETLAND STUDY AREA
- ORDINARY HIGH WATER MARK
- STORMWATER FEATURES
- SOIL CLASSIFICATION BOUNDARIES
- OUTER PROPERTY BOUNDARY

N

PHOTO SOURCE:
SHN, 11/1/2017

1" = 200'±
0 200
FEET

SOIL MAP UNIT (USDA/NRCS):

185	TIMMONS AND LEPOIL, 0-2% SLOPES
257	LEPOIL-CANDYMOUNTAIN COMPLEX, 2-5% SLOPES
258	LEPOIL-ESPA-CANDYMOUNTAIN, 15-50% SLOPES

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SHN Consulting Engineers & Geologists, Inc.

Royal Gold
Wetland Delineation
Glendale, Humboldt County, California

Delineated Wetlands

SHN 016098.006

March 2018 | WD2_Fig3_DelineatedWetlands | Figure 3

unprocessed soils, gravel, and other miscellaneous materials. The area is characterized by a mix of soil piles, bare soil, gravel areas, shrubby areas, and non-native grasslands. Vegetation encroachment has been limited to drainages along the perimeter of the project area. The constant use of the site for industrial purposes has kept the majority of the area in a state of gravelly surface, bare soils, or disturbed grasslands. (Figure 3, Appendix 1, and Appendix 2, Photos B19-B22). The site has been continuously manipulated as seen by multiple layers of fill, non-vegetated areas, equipment tracks, and historic aerial photography, showing constant change within the area of study.

3.2 Site Hydrology

Field investigations were conducted January 17, 24, and 25, 2017, and February 9, 2018. The average annual 30-year precipitation (Eureka Woodley Island: 1981 to 2010) for this area is 49.15 inches (NOAA, 2017). Rainfall for the calendar year of 2016 was 53.13 inches (CDEC, 2017), indicating that the January 2017 test pit excavations were conducted during an above-average rainfall period. The local area experienced severe rainfall and flooding for the first two weeks of January 2017, prior to the initial January 2017 field investigations. The subsequent February 2018 field investigation was conducted during a more moderate rainfall season; the rainfall for the calendar year of 2017 was 48.96 inches (CDEC, 2017).

Another method to review the hydrologic data is the United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) Climate Analysis for Wetlands Table (WETS) system. It reviews the rainfall for the previous three months before test pit investigations (or the same month and two prior if after the 15th). If the current rainfall of each month is within 70% of the 30-year precipitation average (1981-2010), it is a "normal" rainfall; if above, it's ranked "above normal"; if below, it's ranked "below normal". The 2016-2017 rainfall data for the November, December, and January months was used for the January 2017 field work. Its comparison to the 30-year rainfall average (1981-2010) at the Eureka Woodley Island weather station shows an above-normal rainfall climate (Table 1). The 2017-2018 rainfall data for the November, December, and January months was used for the February 2018 field work. Its comparison to the 30-year rainfall average (1981-2010) at the Eureka Woodley Island weather station shows a normal rainfall climate.

Table 1. WETS Rainfall Data
Royal Gold, Glendale, CA

Month	WETS data	Rank	Weight	Value
January 17 through 25, 2017 Test Pit Excavations				
January 2017	Above Normal	3	3	9
December 2016	Above Normal	3	2	6
November 2016	Normal	2	1	2
Total[1]				**17**
February 9, 2018 Test Pit Excavations				
January 2018	Normal	2	3	6
December 2017	Below Normal	1	2	2
November 2017	Above Normal	3	1	3
Total[1]				**11**

1. A sum of 6-9 prior to site investigation is considered a drier than normal rainfall.
   10-14 prior to site investigation is considered a normal rainfall.
   15-18 prior to site investigation is considered a wetter than normal rainfall.

Sources: CDEC, 2017; USDA-NRCS, 2017a

4.0 Vegetation

The study area consists of a generally flat graded surface, gently sloping to the southeast and northwest, with a slight rise in the center of the project area. There is considerable coverage of non-native species, including tall fescue (*Festuca arundinacea*; facultative [FAC]), creeping bentgrass (*Agrostis stolonifera*; [FAC]), sweet vernal grass (*Anthoxanthum odoratum*; facultative upland[FACU]), velvet grass (*Holcus lanatus*; [FAC]), bird's-foot trefoil (*Lotus corniculatus*; [FAC]), and bur-clover (*Medicago polymorpha*; [FACU]), within the grassland and understory of some of the shrubby areas dominated by coyote brush (*Baccharis pilularis*; not listed [NL]). The drainages along the perimeter of the project area were dominated by an overstory of red alder (*Alnus rubra*; [FAC]) and arroyo willow (*Salix lasiolepis*; facultative wetland [FACW]), with an understory of Himalayan blackberry (*Rubus armeniacus*; [FAC]), pampus grass (*Cortaderia jubata*; [FACU]), and common lamp-rush (*Juncus effuses*; [FACW]) (see Photos B12 and B22). There were large areas without vegetation, due to heavy compaction and regular vehicle traffic in portions of the study area. Other more disturbed areas had high coverage by toad rush (*Juncus bufonius;* [FACW]). A complete list of plants observed within the study area is compiled in Table C-1 in Appendix 3.

5.0 Geologic and Soil Composition

The site is set on an alluvial plain of the Mad River and Hall Creek on young alluvial deposits in the lower southern portions of the project, with the northern portions of the project set on the toe slope of the foothills of the coast range made up of the Franciscan formation. The project area is divided by a small rise which drains one side to the northwest and the other to the southeast. The project area is northeast of the Mad River by 600 feet at its nearest point, and northwest of Hall Creek by 700 feet at its nearest point. Various soil colors and textures were found during test pit (TP) analysis that were not consistent with the surrounding soil matrix. These colors indicate numerous sources and layers of fill.

The underlying soils in the project area have a USDA classification of Timmons and Lepoil soils, 0 to 2 -percent slopes (map unit 185), the Lepoil-Candymountain complex, 2 to 15 -percent slopes (map unit 257), and the Lepoil-Espa-Candymountain complex, 15- to 50-percent slopes (map unit 258). Due to the unknown source of fill found onsite, these descriptions are the general depiction of what may be encountered. The actual soil description at each exploratory soil TP is described in the field data forms found in Appendix 4.

185—Timmons and Lepoil soils, 0 to 2 percent slopes

Map Unit Composition
Timmons and similar soils: 45 percent
Lepoil and similar soils: 40 percent
Minor components: 15 percent

Description of Timmons

Typical profile
Ap - 0 to 19 inches: loam
AB - 19 to 30 inches: loam
Bt - 30 to 60 inches: clay loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.2 inches)

Description of Lepoil

Typical profile
A - 0 to 10 inches: loam
AB - 10 to 22 inches: clay loam
Bt - 22 to 60 inches: clay loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.9 inches)

257--Lepoil-Candymountain complex, 2 to 15 percent slopes

Map Unit Composition
Lepoil and similar soils: 45 percent
Candymountain and similar soils: 40
Minor components: 15 percent

Description of Lepoil

(See above description)

Description of Candymountain

Typical Profile
Oi : 0 to 4 inches: slightly decomposed plant material
A : 4 to 15 inches: fine sandy loam
Bw : 15 to 31 inches: fine sandy loam
BC : 31 to 45 inches: fine sandy loam
C : 45 to 60 inches: very fine sand

Properties and qualities
Slope: 2 to 15 percent
Depth to restrictive feature: None within 60 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high or high (0.599 to 1.999 in/hr)
Depth to water table: More than 6 feet
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.6 inches)

258—Lepoil-Espa-Candymountain complex, 15 to 50 percent slopes

Map Unit Composition
Lepoil and similar soils: 35 percent
Espa and similar soils: 30 percent
Candymountain and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lepoil
(See above description)

Description of Espa
Typical profile
A - 0 to 16 inches: loam
BA - 16 to 22 inches: loam
Bt - 22 to 41 inches: loam
BC - 41 to 60 inches: fine sandy loam

Properties and qualities
Slope: 15 to 50 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 39 to 49 inches
Frequency of flooding: None
Custom Soil Resource Report 18

Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.1 inches)

Description of Candymountain
(See above description)
(USDA, 2017b)

6.0 Regulatory Setting

6.1 Federal Laws

6.1.1 Section 401 and 404 of the Clean Water Act

Under Section 404 of the Clean Water Act (CWA; 33 U.S. Code [USC] 1344), as amended, the USACE and the Environmental Protection Agency (EPA) retain primary responsibility for regulating discharge of dredged or fill material into "navigable waters of the United States." All discharges of dredged or fill material into jurisdictional waters of the United States (WoUS) that result in permanent or temporary losses of WoUS are regulated by the USACE. A permit from the USACE must be obtained before placing fill or grading in wetlands or other WoUS, unless the activity is exempt from CWA Section 404 regulation (for example, certain farming and forestry activities).

In summary, the definition of WoUS as defined by 33 Code of Federal Regulations (CFR) Section 328.3 (U.S. Code of Federal Regulations) includes:

1. waters used for commerce,
2. interstate wetlands,
3. all other waters (including lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, and natural ponds),
4. impoundments of water,
5. tributaries to aforementioned waters,
6. territorial seas, and
7. wetlands adjacent to waters.

Under 33 CFR 328.3, WoUS do not include prior converted cropland or waste treatment systems.
In 2008, the EPA and USACE released a guidance memorandum implementing the Supreme Court's decision in the cases of the Rapanos v. U.S. and Carabell v. U.S. Because of these cases, the agencies will apply a significant nexus standard to the following categories of waterbodies to determine if it meets the definition of a WoUS:

- Non-navigable tributaries that are not relatively permanent
- Wetland adjacent to non-navigable tributaries that are not relatively permanent
- Wetland adjacent to but that does not directly abut a relatively permanent tributary

Section 401 of the CWA (33 USC 1341) requires applicants for a federal license or permit obtain a certification that the discharge will comply with the applicable effluent limitations and water quality standards. The certification is obtained from the State in which the discharge originates or would originate, or if appropriate, from the interstate water pollution control agency having jurisdiction over the affected

waters at the point where the discharge originates or would originate. The responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCBs).

6.1.2 Rivers and Harbors Appropriation Act of 1899

The River and Harbors Appropriation Act of 1899 addresses activities that involve the construction of dams, bridges, dikes, and other structures across any navigable water. Placing obstructions to navigation outside established federal lines and excavating from or depositing material in such waters require permits from the USACE Section 10 of the Rivers and Harbors Appropriation Act (33 USC 403) and prohibits the unauthorized obstruction or alteration of any navigable WoUS.

6.2 State Laws – Porter-Cologne Water Quality Control Act

The State maintains independent regulatory authority over the placement of waste, including fill, into waters of the State (WoS) under the Porter-Cologne Water Quality Control Act. WoS are defined by the Porter-Cologne Water Quality Control Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The SWRCB protects all waters in its regulatory scope, but has special responsibility for isolated wetlands and headwaters. WoS are regulated by the RWQCBs under the State Water Quality Certification Program, which regulates discharges of dredged and fill material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act.

Projects that require a USACE permit, or fall under other federal jurisdiction, and have the potential to impact WoS are required to comply with the terms of the Water Quality Certification Program. If a proposed project does not require a federal license or permit, but does involve activities that may result in a discharge to WoS, then the local RWQCB has the option to regulate such activities under its state authority in the form of waste discharge requirements (WDRs) or certification of WDRs. Water Quality Order No. 2004-0004-DWQ specifies general WDRs for dredge or fill discharges to waters deemed by the USACE to be outside of federal jurisdiction under Section 404 of the CWA.

7.0 Methodology

Wetland delineation methods described in *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and *The Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE, 2010) were used to identify potential wetlands and other waters. The routine method for wetland delineation described in the USACE 1987 manual was used to identify potential wetlands within the study area. The USACE method relies on a three-parameter approach, in which criteria for hydrophytic vegetation, hydric soils, and wetland hydrology must each be met (present at the point of field investigation) to conclude that an area qualifies as a wetland.

Hydrophytic vegetation refers to plant species known to be adapted to wetland sites. To classify the hydrophytic plants onsite, the most recent *Western Mountains, Valleys, and Coast 2016 Regional Wetland Plant List* was used (USACE, 2016). Hydric soils are soils that are formed under saturated conditions, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (USDA, 2010). Wetland hydrology is demonstrated through direct evidence (primary indicators) or indirect evidence (secondary indicators) of flooding, ponding, or saturation for a significant portion of the growing season (USACE, 2010).

TP locations were chosen based on site features such as geomorphic position, ponding, and increasing percentages of hydrophytic vegetation. Due to the highly manipulated nature of the site, and the continued use and size of the study area, pits were excavated to investigate conditions representative of large homogenous areas. Using paired pit investigation to ascertain the wetland boundary based on soils was difficult, due to the highly manipulated nature of the soils. Wetland parameters met at each pit often varied widely within a small area, dependent on soil movement, vegetation disturbance, and the nature of fill. At each investigation point determined to lie within a three-parameter wetland, the perimeter of the wetland was established based on hydrology, and changes in vegetation composition. While walking the perimeter of the wetland, the boundary was traced with a global positioning system (GPS) unit using best professional judgment. If a suspected wetland test pit was not determined to be a USACE-designated wetland, no additional analysis was done in the immediate area.

Prior to conducting the field investigation, SHN staff reviewed the USGS topographic quadrangle map (Figure 1); USDA-NRCS Web Soil Survey website (USDA, 2017); and NWI map (USFWS, 2017) (Appendix A). During the field investigation, TPs were characterized at the site for the aforementioned botanical, hydrological, and soil parameters.

TP locations were selected to:

- achieve appropriate coverage and characterization of wetland and upland habitats,
- document potential changes in the vegetative community (such as a shift in the dominant species), and
- determine the approximate boundary line between wetlands and uplands by determining the extent of key wetland criteria (hydrology, hydric soils, and hydrophytic vegetation).

Field investigations were conducted on January 17, 24, and 25. Seventeen (17) individual TPs were excavated to characterize the area and record information for soils, vegetation, and hydrology on USACE Wetland Determination Data Forms (Appendix D). A follow-up survey was conducted on February 9, 2018. Five additional test pits and additional field work was used to supplement the initial investigation and further resolve the wetland and OHWM boundaries. Locations of all TPs are shown on Figure 3. Photos of the study area are included in Appendix 2.

All field mapping was completed with a Yuma Trimble field computer and GPS with geographic information system (GIS) software. SHN downloaded the appropriate aerial photos and digitized relevant site plan mapping (Google Earth, 2016). Several fixed locations (e.g., roadways) were marked as control points (CT) with the Yuma Trimble to get an estimate of aerial imagery accuracy.

7.1 Vegetation Methodology

Prior to the field investigation, a review of plant species reported to be within the project area was performed by querying the "Consortium of California Herbaria" (Consortium of California Herbaria, 2017) database records and "Calflora" (Calflora, 2017) observations. It was determined that the site investigation was performed during an above normal rainfall period by reviewing rainfall data (see Section 3.0 and Table 1). Absolute percent cover of each plant species was visually estimated within the TP and within each vegetation stratum. The tree stratum was inspected at a 30-foot radius centered on the TP, the herbaceous and sapling/shrub strata at a 5-foot radius. Botanical nomenclature follows *The Jepson Manual, Vascular Plants of California* (Baldwin et al., 2012) in addition to the online Jepson Interchange (U. C. Berkeley, 2017) for verification of species whose taxonomy may have changed since its publication.

The wetland indicator status of plant species for this investigation was based on the *Western Mountains, Valleys, and Coast 2016 Regional Wetland Plant List* (USACE, 2016). Synonyms were checked for species that did not appear on the USACE wetland plant list. Plant species were classified as:

- ***Obligate (OBL)–almost always occurs in wetlands***
- ***Facultative-wet (FACW)–usually occurs in wetlands, but may occur in non-wetlands***
- ***Facultative (FAC)–occurs in wetlands and non-wetlands***
- ***Facultative-upland (FACU)–usually occurs in non-wetlands, but may occur in wetlands***
- ***Upland (UPL)–almost never occurs in wetlands***
- ***Not listed (NL)-scored as an upland plant and calculated as such on wetland determination forms***

The 50/20 method[1] was applied to each stratum to determine the dominant plant species and to satisfy the hydrophytic vegetation criteria. If either hydric soils or wetland hydrology were present, the prevalence index[2] was applied. The occurrence and type of plant cover determine whether jurisdictional areas are identified as satisfying the vegetation criteria of a wetland or other waters. Those sites with little or no hydrophytic plant cover, or other sites not capable of supporting hydrophytic plant communities in normal circumstances, are identified as other waters, provided they have an OHWM.

7.2 Soils Methodology

Soils were field-verified for the presence or absence of hydric conditions. All TPs were dug to a minimum depth of 20 inches, and the thickness of each soil horizon was measured. The Munsell Soil Color Chart (Kollmorgen Instruments Corporation, 1998) was referenced to determine the colors of the moist soil matrix and redoximorphic (redox) features (if present). Soils were closely inspected for hydric soil indicators, as defined by the NRCS "Field Indicators of Hydric Soils in the United States" (Version 7.0; USDA, 2010).

7.3 Hydrology Methodology

The presence (or lack) of wetland hydrology indicators was determined by direct observation of surface water, groundwater, or shallow soil saturation during the field investigation. In some cases, hydrology determinations were sought based on hydrology indicators (for example, drainage patterns, geomorphic placement, and water-stained leaves) rather than actual direct evidence from saturation or inundation itself. Additionally, observations were sought to indicate if the site is subject to flooding or standing water. Potential indicators would include water marks, drift deposits, sediment deposits, alpha, alpha-dipyridyl, and similar features. Indicators of extended period saturation would include oxidized rhizospheres surrounding living roots or the presence of reduced iron or sulfur in the soil profile. A site location must contain at least one primary indicator or two secondary indicators to have the hydrology parameter.

1. The 50/20 rule: for each stratum of the plant community, dominant species are the most abundant species that (when ranked in descending order of abundance and cumulatively totaled) immediately exceed 50% of total dominance measure for the stratum, plus any additional species that individually comprise 20% or more of the total dominance measure for the stratum (USACE, 2010).
2. The prevalence index is a weighted-average wetland indicator status of all plant species in the sampling plot or other sampling unit, where each indicator status category is given a numeric code (OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5) and weighting is by abundance (absolute percent cover).

Alpha, alpha-dipyridyl was used on some of the TPs, but due to the above-average rainfall indicated by the WETS rainfall data (Table 1), the occurrence of staining on soil peds was not used as a primary hydrology indicator (Presence of Reduced Iron: C4).

7.4 Ordinary High Water Mark Methodology

For purposes of Section 404 of the CWA, the lateral limits of jurisdiction over non-tidal water bodies in the absence of adjacent wetlands extend to the OHWM. When adjacent wetlands are present, CWA jurisdiction extends beyond the OHWM to the limits of the adjacent wetlands. For purposes of Sections 9 and 10 of the Rivers and Harbors Act of 1899, the lateral extent of federal jurisdiction, which is limited to the traditional navigable waters of the United States, extends to the OHWM, whether or not adjacent wetlands extend landward of the OHWM (USACE, 2014).

USACE regulations define the term OHWM for the purposes of the CWA lateral jurisdiction as follows:

> *The term "ordinary high water mark" means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas at 33 CFR 328.3(e).*

The OHWM in non-perennial streams corresponds with the boundaries of the active channel, which are typically expressed by some combination of three primary indicators: a topographic break in slope, change in sediment characteristics, and change in vegetation characteristics (USACE, 2014). The following supporting features should be considered when making an OHWM determination, to the extent that they can be identified and are deemed reasonably reliable (USACE, 2014):

- Drift/wrack
- Erosion/scour
- Bank undercutting
- Root exposure
- Point bars
- Water staining
- Water staining
- Litter removal
- Silt deposits
- Shelving
- Headcut/knickpoint
- Macroinvertebrates

8.0 Discussion and Results

Field investigations were conducted on January 17, 24, and 25, 2017 and February 9, 2018. Twenty-four TPs were excavated to characterize the area and record information for vegetation, soils, and hydrology (seventeen in 2017 and seven in 2018). During the January 2017 field visits, preliminary wetland and OHWM boundaries were established. A pattern was established between hydric soils, vegetation, and hydrology in a portion of the study area; changes in hydrology, vegetation, and exploratory soil probing were used to further delineate the boundaries of other similar wetlands in the near vicinity. The follow-up February 9, 2018 field work was used to supplement the initial investigation and further resolve the wetland and OHWM boundaries.

A few of the test pits appeared to have been recently manipulated. According to the USDA-NRCS Hydric Soils Technical Note 5 (USDA-NRCS, NR), soils of sand to sandy loamy sands are considered to have achieved

normal circumstances after 3-5 years. More clayey soils achieve normal circumstances after 8 to 10 years. By reviewing current aerial photos and interpreting the structural disturbance of the soils and vegetation, best judgment has been used to determine normal circumstances for soils.

Locations of TPs are shown on Figure 3. Photos of the study area are shown in Appendix 2. In the following sections, the TPs are individually discussed, describing the physical features and considerations of the site, followed by a Data section that summarizes information from the completed Wetland Determination Data Forms located in Appendix 4.

8.1 TP1U Test Site

Discussion

TP1U is located in the northern portion of the study area (Figure 3), and was investigated on January 17, 2017, after a period of heavy rainfall which caused local flooding. This area is representative of a large flat disturbed grassland area. TPs 1 and 2 were excavated on an elevation gradient with TP1U representing the mid-elevation with a slope of 2 to 7-percent. The disturbed grassland represents a large percentage of the northwestern portion of the study area (See Figure 3 and Photo B1).

Data

TP1U has only the vegetation parameter present. The vegetation parameter was met due to dominance of the area by tall fescue [FAC] and toad rush [FACW], with each exhibiting 15-percent cover within the TP area. Lesser dominants include birds-foot trefoil [FAC] with 7-percent cover and the alsike clover (*trifolium hybridum* [FAC]) with 4-percent cover, among others. Forty percent of the area within TP1U was bare ground, a result of constant manipulation of the site and occasional vehicle traffic within the area. No hydric soil indicators were present. Although there was a water table present at 22 inches with saturation up to 5 inches, due to the recent heavy rainfall, TP1U is not considered to meet the hydrology parameter.

8.2 TP2U Test Site

Discussion

TP2U is located in the northern portion of the study area (Figure 3), and was investigated on January 17, 2017, after a period of heavy rainfall which caused local flooding. TP2U is representative of a large flat disturbed grassland area. TPs 1 and 2 were excavated on an elevation gradient with TP2U representing the higher elevation at a slope of 2 to 7. The disturbed grassland area dominates the northwestern portion of the study area (See Figure 3 and Photo B1).

Data

TP2U has only the vegetation parameter present. The vegetation parameter was met due to a dominance of the area surrounding TP2U by toad rush [FACW] with 15-percent cover and tall fescue [FAC] with 10-percent cover. Lesser dominants include alsike clover [FAC] with 5-percent cover and the birds-foot trefoil [FAC], with 3-percent cover, among others. Fifty-eight percent of the area within TP2U was bare ground, a result of constant manipulation of the site and occasional vehicle traffic within the area. No hydric soil indicators were present. Although there was saturation present from 6 to 25 inches, due to the recent heavy rainfall, TP2U is not considered to meet the hydrology parameter.

8.3 TP3U Test Site

Discussion

TP3U is located in the northern portion of the study area (Figure 3), and was investigated on January 17, 2017, after a period of heavy rainfall which caused local flooding. TP3U is representative of a large, highly manipulated section of the northern project boundary. Soils within this area appear to have been moved around within recent months, precluding the growth of most plants. Water was seen ponding in the area as a result of tire tracks, uneven soil grading, and an uneven soil surface, due to heavy rainfall within the previous week. Although there is apparent recent soil manipulation in this area, because of the geomorphic positioning, this site does not appear to potentially support hydrology or hydric soils in the future. The area was slightly sloping to the west from 0-5 percent (See Figure 3 and Photo B4). Site visits in February 2017 show that this site drained after the heavy rains of January 2017.

Data

TP3U has only the vegetation parameter present. The vegetation parameter was met due to the presence of tall flat sedge (*Cyperus eragrostis* [FAC]) with 3-percent cover. Ninety-six percent of the area surrounding TP3U was bare soil. Because of the very small area covered in vegetation, the vegetation parameter met at TP3U is not a strong indicator of dominance by hydrophytic vegetation. The 96-percent bare ground within TP3U is a result of constant manipulation of the site and vehicle traffic within the area. No hydric soil indicators were present. Although there was a water table present at 22 inches with saturation up to 3 inches, due to the recent heavy rainfall, TP3U is not considered to meet the hydrology parameter.

8.4 TP4U Test Site

Discussion

TP4U is located in the northern portion of the study area (Figure 3), and was investigated on January 17, 2017, after a period of heavy rainfall which caused local flooding. TP4U is representative of the northern edge of the large manipulated area investigated at TP3U. While still made up of fill soils, vegetation was not as recently manipulated as TP3U. TP4U was located within a slight swale on highly compacted gravel and cobbles mixed with charcoal and burned woody debris (See Figure 3 and Photo B3).

Data

TP4U has both the vegetation and hydrology parameters present. The vegetation parameter was met due to a dominance of the area surrounding TP4U by velvet grass [FAC] with 20-percent cover and birds-foot trefoil [FAC] with 18-percent cover. Lesser dominants include the common lamp rush [FACW] with 12-percent cover, among others. Thirty-eight percent of the area around TP4U was bare ground, a result of manipulation of the site and occasional vehicle traffic within the area. No hydric soil indicators were present. There was a water table present at 6 inches with saturation up to the ground surface, meeting the hydrology parameter (Indicators A2 and A3). It is possible that the recent heavy rains have produced hydrology in an area that would not normally have hydrology, however the location within a slight depression suggests that water will naturally flow here during normally wet months.

8.5 TP5 Test Site (TP5U and TP5W paired plots)

Discussion

The TP5 site is located in the northwestern portion of the study area (Figure 3). The wetland test pit (TP5W) and its upland test pit (TP5U) are located 35 feet apart. TP5U was investigated on January 17, 2017, after a period of heavy rainfall which caused local flooding, and TP5W on February 9, 2018 during a normal rainfall

period. The TP5 site is representative of a lower elevation area at the edge of developing alder canopy. The drainageway to the west of the project area is prohibited from flooding the site by a berm constructed along the northwestern boundary of the project area. This area was on the western edge of disturbed grassland and showed lower levels of vegetation coverage due to historic and recent disturbance. Slopes ranged between 0 and 2 percent within the area immediately surrounding the TP5 site (See Figure 3 and Photo B2).

TP5W

Data

TP5W has all three parameters present. The vegetation parameter contained only an herb stratum. The dominant species for the herb stratum was 46-percent pennyroyal (*Mentha pulegium* [OBL]). Other lesser dominated species were 10-percent creeping bentgrass [FAC] and 8-percent panicled bulrush (*Scirpus microcarpus* [OBL]), among others. The hydric soil parameter was met with the F3 (Depleted Matrix) indicator. The hydrology parameter was met with the primary hydrology A2 (High Water Table), A3 (Saturation), and B4 (Algal mat or Crust) indicators, as were the secondary D2 (Geomorphic Position) and the D5 (FAC-Neutral) indicators. The high water table was observed at 7 inches and saturation up to 4 inches within the ground surface.

TP5U

Data

TP5U had both the vegetation and hydrology parameters present. The vegetation parameter was met due to a dominance of the area surrounding TP5U by wild radish (*Raphanus sativus*) [NL] with 15-percent cover, tall fescue [FAC] with 12-percent cover, and toad rush [FACW] with 10-percent cover. Lesser dominants include the alsike clover [FAC] with 3-percent cover, among others. Fifty-one-percent of the area around TP5U was bare ground, a result of site manipulation and occasional vehiclular traffic within the area. No hydric soil indicators were present. There was a water table present at 12 inches with saturation up to the ground surface, meeting the hydrology parameter (Indicators A2 and A3). Hydrology reflects the recent rainfall, low elevation of the area surrounding TP5U, and the close proximity to the drainage.

8.6 TP6 Test Site (TP6U and TP6W paired plots)

Discussion

TP6W is located in the northwestern portion of the study area (Figure 3), and was investigated on January 17, 2017, after a period of heavy rainfall which caused local flooding. TP6W is representative of a swale draining water from the middle of the site to the drainage along the western boundary of the project area, with a 0-5% slope allowing water to drain, but not quickly (See Figure 3 and Photo B5). This pit was excavated in unconsolidated fill, and the soils are not considered to have normal circumstances as defined by the USDA-NRCS Hydric Soils Technical Note 5 (USDA-NRCS, NR). This site appears to have been an older drainage. TP6U is its paired plot and was investigated on February 9, 2018 during a normal rainfall period. It is located 57 feet from TP6W.

Data

TP6W

TP6W had all three wetland parameters present. The vegetation parameter was met due to a dominance of the area surrounding TP6W by tall fescue [FAC] with 35-percent cover. While small grass sprouts assumed to be *Poa* species also met dominance, vegetation was assumed hydrophytic based on the presence of wetland hydrology and hydric soils. Lesser dominants include the annual dogtail (*Cynosurus echinatus* [NL]) with 5-

percent cover, and velvet grass [FAC] with 4-percent cover, among others. Only 14 percent of the area around TP6W was bare ground. Thirty (30) percent of the area around TP6W was dominated by unidentifiable grass sprouts that will fill in the area as they mature.

A sandy gleied layer (Indicator S4) was found at 18-inches below the ground surface. Because of the apparent recently placed fill at this site, and its geomorphic placement, it is judged that the sandy gleyed layer would have been within 6 inches, as required by this indicator. If reviewed again within 3 to 5 years, as suggested for normal circumstances to return (USDA-NRCS, NR), it is likely that this or other hydric soil indicators would then be present.

There was a water table present at 12 inches with saturation up to the ground surface, meeting the primary indicators A2 (High Water Table) and A3 (Saturation), as well as the secondary indicator D2 (Geomorphic Position). The hydrology parameter has been met.

Data

TP6U

TP6U had two parameters present: hydrology and vegetation. In the vegetation parameter, there was only the herb stratum present. The dominant species for the herb stratum was 42-percent Italian ryegrass (*Festuca perennis* [FAC]) and 28-percent tall fescue [FAC]. Other lesser dominated species were 6-percent bird's-foot trefoil [FAC] and 5-percent hairy cat's ear (*Hypochaeris radicata* [FACU]), among others. The hydric soil parameter was not met. The hydrology parameter was met with the observed primary hydrology A2 (High Water Table) and the A3 (Saturation) indicators. The high water table was observed at 11 inches and saturation up to 9 inches within the ground surface.

8.7 TP7U Test Site

Discussion

TP7U is located in the northwestern portion of the study area (Figure 3), and was investigated on January 17, 2017, after a period of heavy rainfall which caused local flooding. TP7U is representative of an upland area that has not recently been disturbed. This area is elevated approximately 18 inches above the area represented by TPs 1, 2, 5, and 6. As such, water is likely to drain more quickly precluding the existence of hydrology and hydric soils. Furthermore, this corner of the project area appears to have remained relatively undisturbed since the closure of the mill and supports well-developed non-native grasslands (See Figure 3 and Photo B6).

Data

TP7U had only the vegetation parameter present. The vegetation parameter was met due to an overwhelming dominance of the area surrounding TP7U by tall fescue [FAC] with 80-percent cover. Lesser dominants include sweet vernal grass (*Anthoxanthum odoratum*) [FACU] with 12-percent cover and spring vetch (*Vicia sativa* [UPL]) with 4-percent cover, among others. Vegetation had over 100-percent total cover within the area surrounding TP7U, reflecting the lack of recent disturbance. No hydric soil or hydrology indicators were present.

8.8 TP8U Test Site

Discussion

TP8U is located in the northern portion of the study area (Figure 3), and was investigated on January 17, 2017, after a period of heavy rainfall which caused local flooding. TP8U was excavated near the crest of a

small rise that separates the southeastern portion of the project from the northwestern portion of the project area. As such, it is expected that water will readily flow off this area into more low-lying regions of the project area. TP8U was excavated in order to more closely investigate conditions surrounding some ponded water near the crest of this slight rise (See Figure 3 and Photo B7). The perched water appeared to be a result of the heavy rains that occurred the week preceding the field work, as the site had dried out by the next field visit six days later.

Data

TP8U had only the vegetation parameter present. The vegetation parameter was met due to a dominance of the area surrounding TP8U of creeping bentgrass [FAC] with 22-percent cover, and tall flat sedge [FACW] with 10-percent cover. Lesser dominants include bird's-foot trefoil [FAC] with 2-percent cover and several obligate species comprising less than 2-percent cover collectively. Sixty-two percent of the area around TP8U was bare ground, with 50% covered by ponded water. Lack of vegetation surrounding TP8U is likely a result of the ponded water and recent manipulation of the site, including irregular vehicle traffic and compacted clay. No hydric soil or hydrology indicators were present. Water appeared to be perched on a recently introduced clay soil. Under this clay soil was the gravelly cobble fill mixed with woody debris from the mill. Beneath the clay soils, the water table was at an approximate 21-inch depth.

8.9 TP9U Test Site

Discussion

TP9U is located in the northern portion of the study area (Figure 3), and was investigated on January 24, 2017, after a period of heavy rainfall which caused local flooding. TP9U was excavated on the eastern side of the small rise that separates the southeastern portion of the project from the northwestern portion of the project area. It is expected that water will readily flow off this area into more low-lying regions of the project area. The headwaters of the eastern drainage begin approximately 80 feet to the east of TP9U. TP9U represents conditions along the crest of the small rise with the slope averaging 0-2 percent (See Figure 3 and Photo B8).

Data

TP9U did not meet any wetland parameters. The vegetation parameter was not met due to a dominance of the area surrounding TP 9 by Scotch broom (*Cytisus scoparius* [NL]) with 35-percent cover and creeping bentgrass [FAC] with 35-percent cover. Lesser dominants include sweet vernal grass [FACU] with 4-percent cover, and English plantain (*Plantago lanceolata* [FACU]) with 3-percent cover, among others. Because wetland plants did not constitute over 50-percent of the dominant species around TP9U, the area is not considered dominated by hydrophytic vegetation. Only 16-percent of the area around TP9U was bare ground. No hydric soil or hydrology indicators were present. TP9U represents the best example of the native soil on site due to a lack of fill placed in the vicinity.

8.10 TP10U Test Site

Discussion

TP10U is located in the northern portion of the study area (Figure 3), and was investigated on January 24, 2017, after a period of heavy rainfall which caused local flooding. TP10U was excavated within an excavated depression that had filled with water. The area was catching water from the hillslope to the north and appears to have been connected to the eastern drainage at one point. This area also represents an interface

between the fill soils and the native underlying soils (Photo B9). The area to the south of TP 10 is upland and would be similar to the conditions found at TP9U, with very little vegetation cover (See Figure 3 and Photo B8).

Data

TP10U had both the vegetation and hydrology parameters present. The vegetation parameter was met due to a dominance of the area surrounding TP10U by red alder saplings [FAC] with 90-percent cover in the tree stratum, and pampus grass [FACU] with 15-percent cover, and velvet grass [FAC] with 6-percent cover dominant in the herb stratum. Lesser dominants include Sitka spruce (*Picea sitchensis* [FAC]) with 8-percent cover, sword fern (*Polystichum munitum* [FACU]), panicled bulrush [OBL], and common lamp-rush [FACW], each with 2-percent cover, among others. The red alders at TP10U represent a developing red alder canopy and woodland structure within previously maintained drainages. No hydric soil indicators were present. Soils consisted of 13 inches of gravelly fill with wood debris over native clay soils. The hydrology parameter was met with surface water observed as well as ground water at 9 inches and saturation to ground level (Indicators A1, A2, and A3).

8.11 TP11U Test Site

Discussion

TP11U is located in the northeastern portion of the study area (Figure 3), and was investigated on January 24, 2017, after a period of heavy rainfall which caused local flooding. TP11U was excavated at the interface between more manipulated upland conditions, and lower elevations along the eastern drainage. The area was outside of the developing red alder canopy, but lower in elevation than the surrounding fill. This area represents the transition between the drainage and the more apparent upland areas (see Figure 3 and Photo B11).

Data

TP11U had both the vegetation and hydrology parameters present. The vegetation parameter was met due to a dominance of the area surrounding TP11U by red alder [FAC] with 60-percent cover in the tree stratum, Himalayan blackberry [FAC] dominant in the shrub stratum with 1-percent cover, and common lamp-rush [FACW] with 15-percent cover and velvet grass [FAC] with 12-percent cover dominant in the herb stratum. Lesser dominants include hairy cats-ear [FACU] with 8-percent cover and birds-foot trefoil [FAC] with 5-percent cover, among others. The 59-percent bare ground within the herb stratum was due to leaf litter and woody debris. The red alder at TP11U represent a developing red alder canopy and woodland structure within previously maintained drainages. No hydric soil indicators were present. The hydrology parameter was met with saturation indicator A3. It was observed starting at the 21-inch groundwater table up to ground level. Because of the lower elevation of the area represented by TP11U, it is expected that water draining from the site would pass through this area before entering the drainage. The recent heavy rains may account for the elevated saturation levels.

8.12 TP12U Test Site

Discussion

TP12U is located in the northeastern portion of the study area (Figure 3), and was investigated on January 24, 2017, after a period of heavy rainfall which caused local flooding. TP12U was excavated in a low-sloped area slightly lower in elevation than some of the surrounding areas. Water from the previous storm slowly drained eastward at a depth of approximately one inch. TP12U was placed midway between the area

continuously used for industrial activities and the eastern drainage. It is expected that water draining from the more industrial areas would pass through this area before entering the drainage to the east. This area appears to have remained relatively undisturbed since the closure of the mill (See Figure 3 and Photo B10).

Data

TP12U had both the vegetation and hydrology parameters present. The vegetation parameter was met due to a dominance of the area surrounding TP12U by common lamp-rush [FACW] with 45-percent cover. Lesser dominants include birds-foot trefoil [FAC] with 12-percent cover, bur clover [FACU], hairy cats-ear [FACU], and velvet grass [FAC], each with 10-percent cover, among others. There was only 6-percent bare ground within the herb stratum at this site. No hydric soil indicators were present. The hydrology parameter was met with saturation indicator A3; it was observed starting at the 21-inch groundwater table up to ground level. The recent heavy rains may account for the elevated saturation levels.

8.13 TP13W Test Site (Paired plot to TP14U)

Discussion

TP13W is located in the northeastern portion of the study area (Figure 3), and was investigated on January 24, 2017, after a period of heavy rainfall which caused local flooding. TP13W was placed within a swale that was connected with the eastern drainage. The swale appears to collect water from more upland areas including the area represented by TP12U. TP13W was dominated by young red alder canopy and appears to have remained undisturbed since the time of the mill closure. Soils were typical of the old mill fill soils including gravel and cobbles (See Figure 3 and Photo B12).

Data

TP13W had all three wetland parameters present. The vegetation parameter was met due to a dominance of the area surrounding TP13W by red alder [FAC] with 80-percent cover in the tree stratum, Himalayan blackberry [FAC] dominant in the shrub stratum with 10-percent cover, and common lamp-rush [FACW] dominant in the herb stratum with 65-percent cover. Lesser dominants included velvet grass [FAC] with 5-percent cover, among others. The 28-percent bare ground within the herb stratum was due to leaf litter and woody debris. The red alder at TP13W represent a developing red alder canopy and woodland structure within previously industrial drainages. The hydric soil indicator redox dark surface (Indicator F6) was present. The hydrology parameter was met with the following indicators: high water table (A2) at 10 inches and the saturation indicator (A3). Saturation was observed starting at the 10-inch groundwater table up to ground level. It is expected that water draining from the more upland areas would pass through this area before entering the drainage to the east. The recent heavy rains may account for the elevated saturation levels.

8.14 TP14U Test Site (Paired Plot to TP13W)

Discussion

TP14U is the paired plot to TP13W, and it is located in the northeastern portion of the study area (Figure 3), and was investigated on January 25, 2017, after a period of heavy rainfall which caused local flooding. TP14U was excavated at the upper end of the swale represented by TP13W, near the transition from wetland to upland conditions. Red alder within the vicinity of TP14U was stunted; however, the area appears to have remained undisturbed since the closure of the mill. Conditions at TP14U are similar to those observed at TP7U with heavy dominance by tall fescue grassland (See Figure 3; Photos B7 and B13).

Data

TP14U had only the vegetation parameter present. The vegetation parameter was met due to a dominance of the shrub stratum of the area surrounding TP14U by red alder [FAC] with 2-percent cover and Himalayan blackberry [FAC] with 3-percent cover. Tall fescue [FAC] was dominant in the herb stratum with 70-percent cover. Lesser dominants included velvet grass [FAC] with 10-percent cover and Queen Anne's lace (*Daucus carota* [FACU]) with 10-percent cover among others. There was only 2-percent bare ground within the herb stratum. The red alder at TP14U were stunted, reflecting the marginal growing conditions for this species in this location. No hydric soil or hydrology indicators were present. Soils were typical of old mill fill, however there was evidence of past hot fires within this area with charred soils and a mix of buried burned woody debris.

8.15 TP15W Test Site

Discussion

TP15W is located in the northeastern portion of the study area (Figure 3), and was investigated on January 25, 2017, after a period of heavy rainfall which caused local flooding. TP15W was excavated within a swale, with a developing canopy of red alder. The swale eventually connects to the eastern drainage, and water is regularly ponding within the lower elevations of the swale. The red alder at TP15W are growing rapidly within the wetter areas of the swale. Vegetation does not appear to have been disturbed since the closure of the mill in 2002. Fill soils were a sandy loam, possibly a reflection of erosion and sedimentation in this area. TP15W represents the conditions found within the wet swale just north of the current industrial area (See Figure 3 and Photo B14).

Data

TP15W met all three wetland parameters of hydrophytic vegetation, hydric soils, and hydrology. The vegetation parameter was met due to a dominance of the area surrounding TP15W by red alder [FAC] with 80-percent cover in the tree stratum, and tall fescue [FAC] dominant in the herb stratum with 15-percent cover. Lesser dominants included velvet grass [FAC] with 5-percent cover and creeping bentgrass [FAC] with 4-percent cover, among others. The 75-percent bare ground within the herb stratum was due to leaf litter and woody debris from the red alder overstory. The red alder at TP15W represent a developing red alder canopy and woodland structure within wet areas of former industrial drainages. Hydric soils were present at TP15W reflecting the wet conditions found within the swale; the A4 (Hydrogen Sulfide) and F2 (Loamy Gleyed Matrix) indicators were met. Hydrology was present within the area surrounding TP15W with the primary indictors A2 (High Water Table), A3 (Saturation), C1 (Hydrogen Sulfide Odor), and C4 (Presence of reduced iron). The high water table was at 7 inches and saturation up to the ground surface; however, this could be inflated due to recent heavy rains.

8.16 TP16W Test Site

Discussion

TP16W is located in the middle of the study area (Figure 3), and was investigated on January 25, 2017, after a period of heavy rainfall which caused local flooding. TP16W was excavated within a wooded detention basin that is a remnant of the mill's log pond. The area is now used for stormwater retention and contains water during most months (personal communication with the Qualified Industrial Stormwater Practioner [QISP] for Royal Gold). Conditions within the retention facility have changed throughout the years, with portions being filled and other areas being excavated. The location of TP16W has been relatively undisturbed since 2006, as evidenced by tree size and historical aerial photography (See Figure 3 and Photos B15 and B16).

Data

TP16W met the vegetative, hydric soils, and hydrology parameters, and is therefore considered a wetland. The vegetation parameter was met due to a dominance of the area surrounding TP16W by arroyo willow [FACW] with 30-percent cover in the tree stratum, Himalayan blackberry [FAC] with 7-percent cover in the shrub stratum, and bur clover [FACU] dominant in the herb stratum with 35-percent cover. Lesser dominants included velvet grass [FAC] with 10-percent cover and tall fescue [FAC] with 8-percent cover, among others. The 42-percent bare ground within the herb stratum was due to leaf litter and woody debris from the arroyo willow overstory. The arroyo willow at TP16W represents a developing woodland structure within the retention facility. The hydric soil indicator Redox Depressions (F8) was observed. The following hydrology indicators were observed: High Water Table (A2) with a water table at 4 inches, Saturation (A3) from the 4-inch water table to ground surface, Iron Deposits (B5), Oxidized Rhizospheres along Living Roots (C3), and Presence of Reduced Iron (C4). While the water level within the detention basin may have been higher than usual due to the previous rains, it is expected that this area will have standing water for the duration of the wet months, and represents wetland conditions and habitat.

8.17 TP17U Test Site

Discussion

TP17U is located in the middle portion of the study area (Figure 3), and was investigated on January 25, 2017, after a period of heavy rainfall which caused local flooding. TP17U was excavated within a drainage swale that feeds into the catchment basin located at TP16W. This feature was also in existence as a constructed drainage feature when the mill was in operation. Sediment is periodically cleaned out with stormwater flowage into the sediment catchment pond below. Young red alder and arroyo willow have become established within the stormwater overflow conveyance feature (Photos B17 and B18).

Data

TP17U met two wetland parameters of hydrophytic vegetation and wetland hydrology, and is not considered a wetland. The vegetation parameter was met due to a dominance of the area surrounding TP17U by red alder [FAC] with 50-percent cover, and arroyo willow [FACW] with 20-percent cover in the tree stratum, Himalayan blackberry [FAC] with 3-percent cover in the shrub stratum, and bur clover [FACU] dominant in the herb stratum with 45-percent cover. Lesser dominants included tall flat sedge [FACW] with 5-percent cover. The 50-percent bare ground within the herb stratum was due to recently deposited silt/soil, reflecting the nature of the sediment catchment basin. The red alder and arroyo willow at TP17U represent a developing woodland structure within the detention basin.

No hydric soil indicators were met. The constant state of sediment deposition and erosion is not conducive for hydric soil development. The following hydrology indicators were observed: High Water Table (A2) at 5 inches and Saturation (A3) from the 5-inch water table to ground surface.

8.18 TP18U Test Site

Discussion

TP18U was excavated on February 9, 2018 to help clarify the anticipated preliminary wetland boundaries delineated in 2017. It is located in the western portion of the project area in a swale dominated by red alder [FAC], Himalayan blackberry [FAC], sweet vernal grass [FACU], and velvet grass [FAC]. The swale appears to have been a remnant constructed drainageway that is currently blocked by berms. It was initially thought to

be a wetland site, using the hydric soil F8 (Redox Depressions) indicator, but it was determined not to be a depressional site after clarifying with the site manager that the swale drains westwards out of the ponded area. There were no other hydric soil indicators met (Figure 3; Photo B23).

Data

TP18U met two wetland parameters of hydrophytic vegetation and wetland hydrology, and is not considered a wetland. The vegetation parameter was met due to dominance of the area by hydrophytic vegetation. The dominant species for the tree stratum was red alder [FAC] with 30-percent cover. The dominant species for the sapling/shrub stratum was Himalayan blackberry [FAC] with 10-percent cover. The dominant species for the herb stratum was velvet grass [FAC] with 30-percent cover and sweet vernal grass [FACU] with 22-percent cover. Other lesser dominate species included common lamp rush [FACW] with 15-percent cover and tall fescue [FAC] with 4-percent cover, among others. The hydric soil parameter was not met. The hydrology parameter was met with the observed primary hydrology A3 (Saturation) indicator and the secondary D2 (Geomorphic Position) indicator. The saturation was observed up to the ground surface.

8.19 TP19U Test Site

Discussion

TP19U was excavated on February 9, 2018 as the upland paired plot to TP18U, but the TP18 site was determined to not have hydric soil indicators. It is located 12 feet north of TP18U, out of the swale and on an old graveled roadway (Figure 3; Photo 24).

Data

TP19U did not meet any wetland parameters, and it is not considered a wetland. The area was dominated by upland vegetation species, including hairy cat's ear [FACU] with 20-percent cover and sweet vernal grass [FACU] with 12-percent cover among others. The tree stratum was dominated by red alder [FAC], however, the majority of the tree cover was rooted from adjacent areas investigated at TP18U. There were no hydric soil or hydrology indicators observed.

8.20 TP20U Test Site

Discussion

TP20U was excavated on February 9, 2018 to confirm the upland/wetland boundary observed during the preliminary 2017 wetland investigation. (Figure 3; Photo B25).

Data

TP20U met two wetland parameters of hydrophytic vegetation and wetland hydrology, and is not considered a wetland. The dominant species for the herb stratum was tall flat-sedge [FACW] with 18-percent cover, penny royal [OBL] with 15-percent cover, and waxy manna grass (*Glyceria declinata* [FACW]) with 12-percent cover. Other lesser dominate species included birds-foot trefoil [FAC], among others.

There were no hydric soil indicators observed. The hydrology parameter was met with the observed primary hydrology A2 (High Water Table) and A3 (Saturation) indicators and the secondary D5 (FAC-Neutral Test) indicator. The high water table was observed at 8.5 inches and the saturation up to 7 inches of the ground surface.

8.21 TP21U Test Site

Discussion

TP21U was excavated on February 9, 2018 to help clarify anticipated wetland features delineated in 2017. It is located in the eastern portion of the project area in a drainage feature constructed during the initial creation of the mill in the 1950s. This location has been significantly graded as evidenced by a 10- to 15-foot embankment directly east of the drainage feature that was excavated out of the sloping hillside to create a relatively flat area for the storage of logs. The drainage feature was created to catch water from the hillside and log storage area, and now drains south into wetlands and eventually connects with Hall Creek off of the project area. (see Figure 3; Photo B26).

Data

TP21U only met two wetland parameters of hydrophytic vegetation and wetland hydrology, and it is not considered a wetland. The vegetation parameter was met due to dominance of the tree and herb layer by hydrophytic vegetation. The dominant species within the tree stratum was red alder [FAC] with 35-percent cover, Pacific willow (*Salix lasiandra* [FACW]) with 30-percent cover, and Sitka spruce [FAC] with 20-percent cover. The dominant species within the sapling/shrub stratum was California blackberry (*Rubus ursinus* [FACU]) with 8-percent cover and Himalayan blackberry [FAC] with 5-percent cover. The dominant species within the herb stratum was creeping buttercup (*Ranunculus repens* [FAC]) with 12-percent cover and sword fern [FACU] with 10-percent cover. Other lesser dominate species included water parsley (*Oenanthe sarmentosa* [OBL]) and slender-footed sedge (*Carex leptopoda* [FAC]), among others.

The hydric soil parameter was not met. TP21U was excavated near the top of the excavated drainage and does not hold water long enough to develop hydric soils. The hydrology parameter was met with the observed primary hydrology A2 (High Water Table), A3 (Saturation), and B9 (Water-Stained Leaves) indicators. The secondary D2 (Geomorphic Position) and D5 (FAC-Neutral Test) indicators were also observed. The high water table was observed at 2 inches with saturation up to the ground surface.

8.22 TP22W Test Site

Discussion

TP22W was excavated on February 9, 2018 to determine the wetland boundary within the drainageway feature along the eastern border of the project area. This feature becomes a wetland area when enough water flows into and is retained within this feature to develop hydric soil indicators and support hydrophytic vegetation.

Data

TP22W met all three wetland parameters, and it is considered a wetland. The vegetation parameter was met due to dominance of hydrophytic vegetation in the tree, sapling/shrub, and herb strata. The dominant species within the tree stratum was Pacific willow [FACW] with 80-percent cover and red alder [FAC] with 15-percent cover. The dominant species within the sapling/shrub stratum was Himalayan blackberry [FAC] with 2-percent cover and California blackberry [FACU] with 1-percent cover. The dominant species within the herb stratum was common lamp-rush [FACW] with 5-percent cover and creeping buttercup [FAC] with 4-percent cover.

The hydric soil parameter was met with the A4 (Hydrogen Sulfide), A10 (2 cm Muck), and the positive reaction of the alpha, alpha-dipyridyl on 60-percent of the upper 12 inches of the test pit surface. The hydrology parameter was met with the observed primary hydrology A2 (High Water Table) and A3

(Saturation). The secondary D2 (Geomorphic Position) and D5 (FAC-Neutral Test) indicators were also observed. The high water table was observed at 10 inches with saturation up to within 8 inches of the ground surface.

8.23 Ordinary High Water Mark (OHWM)

OHWM features were observed within the northwestern drainage of the survey area (Figure 3). The drainage meets the characteristics of a channelized second-order stream. Due to the historic excavation of the channel, OHWM indicators were somewhat obscure, and cut banks often made for false OHWM indicators. OHWM was evidenced by scouring/erosion, changes in vegetation, matted vegetation, and debris in the direction of flow, as well as a slight change in soil texture, and a slight break in slope. The channelized second order stream drains into a drainage inlet (DI) that takes the water under the road and away from the site. A cross-section of the drainage feature is included in Appendix 4 (OHWM-PT1).

8.24 National Wetlands Inventory (NWI)

The USFWS NWI website (Appendix A) shows freshwater emergent wetland (PEM1C) NWI designation in the study area. This general categorization by the NWI is not intended for planning purposes, because of the lack of ground-truthing. In their "Data Limitations, Exclusions and Precaution" statement, it points out that:

> *The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.*
> (USFWS, 2017)

While PEM1C was found within the study area, the NWI mapping was found to be inaccurate during the site-specific analysis. Test pit areas designated as wetland by the NWI mapping but not found to exhibit three-wetland parameters during this project were TP1U, TP2U, TP3U, and TP20U. In addition, other areas that were delineated by SHN as wetlands were not mapped on the NWI map. This includes the area around TP6W, TP13W, TP15W, and TP22W. Each of these pits represented areas that meet USACE three-parameter wetlands.

9.0 Conclusions

The preliminary 2017 site investigation occurred during an above normal rainfall season, while the follow-up 2018 delineation occurred during a normal rainfall season (Section 3.2 Site Hydrology). Following the USACE three-parameter guidelines, TP5W, TP6W, TP13W, TP15W, TP16W, and TP22W meet the three wetland parameters of hydrophytic vegetation, hydric soils, and wetland hydrology indicators necessary to place them within wetland boundaries (Figure 3; Table 2). Within each of these pits, soils, hydrology, and vegetation were problematic, reflecting the historic and continuing disturbance of this industrial site. Fill soils were present within each pit, and hydrology was manipulated due to past excavation and large machinery work. Vegetation ranged from highly disturbed to not disturbed since closure of the mill. Because of the heavy manipulation of these parcels, this is the most current wetland mapping onsite. Conditions will continue to change, and areas that are currently not mapped as three-parameter wetlands

may in the future meet all three parameters as wetland mitigation or additional stormwater management facilities are installed. Similarly, areas mapped as three-parameter wetlands may meet fewer parameters in the future due to changes in stormwater flows and hydrology across the site or climatic variability.

Freshwater emergent wetlands comprise the jurisdictional features across this site. These wetlands occur along the fringes of an industrial site, in areas that collect water and have not been disturbed since the closure of the mill. OHWM was observed within the drainageway along the northwestern border of the project area, within an excavated channel. Table 2 describes the wetland conditions found at each TP within this project area.

Table 2. Wetland Delineation and OHWM[1] Results
Royal Gold, Glendale, CA

Aquatic Resource Name	Cowardian Type	Central Longitude/Latitude[2]	Area (acres)	Linear Length (linear feet)
Wetland #1	**PEM1C[3]**	40.904135°/ -124.021834°	1.40	N/A[4]
Wetland #2	**PEM1C**	40.902502°/-124.017995°	1.17	N/A
Wetland #3	**PEM1C**	40.901850°/-124.019936°	0.29	N/A
OHWM #1	**PEM1C**	40.904073°/-124.022016°	0.33	607
Total			**3.19**	**607**

1. OHWM: Ordinary high water mark
2. In decimal degrees
3. Palustrine emergent persistent seasonally flooded
4. N/A=not applicable

10.0 Limitations

The conclusions in this report represent a "snapshot in time" and it is possible that some species were not present at the time of the fieldwork. This report documents the investigation by using the best professional judgment of SHN's botanist and soil scientist. The conclusions should be verified by the USACE through receipt of a jurisdictional determination letter.

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National Wetlands Inventory

1

U.S. Fish and Wildlife Service
National Wetlands Inventory

Royal Gold NWI Map

January 17, 2017

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Site Photographs 2

Photo B1: TP1 and 2 Area Terrain

Photo B2: TP5 site looking SE

Photo B3: TP4U site looking SW. Note manipulated soils, pooling water, and mixed vegetation.

Photo B4: TP3U Site looking North. Note recently manipulated soils, pooled water due to uneven surface. Water had drained within a few days.

Photo B5: TP6W Site looking west (3-parameter).

Photo B6: TP7U Site looking NW. Note tall fescue dominance and coyote brush.

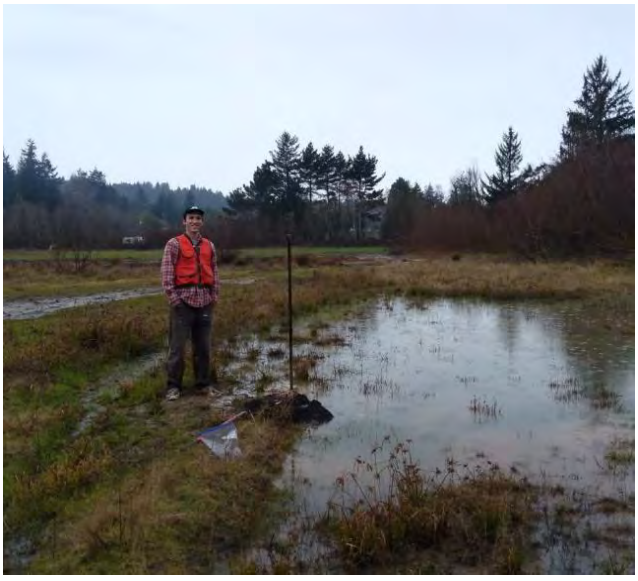


Photo B7: TP8U Site looking west. Note rain falling. Standing water dried up within a few days.

Photo B8: TP9U Site looking north

Photo B9: TP10U Site looking north. **Note red alder, pampas grass, and pooled water.**

Photo B10: TP12U Site looking SE. **Note dominance of the area by *Juncus effuses* and pampas grass.**

Photo B11 TP11U Site looking SE. **Note ponding (dried in a few days), industrial debris, and red alder.**

Photo B12: TP13W Site looking east. **Note developing red alder woodland (3 parameters met).**

Photo B13: TP14U Site looking north. Note dominance by tall fescue, typical of less disturbed areas across the site.

Photo B14: TP15W Site looking South. Note developing red alder canopy (3 parameters met).

Photo B15: TP16W Site looking SE. Note TP at edge of ponded water. Soils becoming less hydric at this point. (3 parameters met).

Photo B16: TP16W Site looking east across detention basin. Note developing canopy and existing industrial use beyond.

Photo B17: TP17U Site looking east. Note check dam structure and existing industrial use. Sediment is removed annually.

Photo B18: TP17U Site looking north. Note captured sediment and industrial use beyond. Sediment is removed annually.

Photo B19: Study area looking southwest.

Photo B20: Study area looking east.

Photo B21: Study area looking south.

Photo B22: Study area looking northeast. Note riparian woodland to the east.

Photo B23: TP18U depressional site.

Photo B24: TP19U roadway looking west.

Photo B25: TP20U (orange flagging) looking north.

Photo B26: TP21U in old constructed drainageway on the east side of the project.

Plant List 3

Table C-1
Plants Observed at Wetland Pits January 17, 24, and 25, 2017 and February 9, 2018
Royal Gold, Glendale, California

Scientific Name	Common Name	Indicator 2016[1]
Agrostis stolonifera	creeping bentgrass	FAC
Alisma triviale	northern water plantain	OBL
Alnus rubra	red alder	FAC
Anthoxanthum odoratum	sweet vernal grass	FACU
Carex leptopoda	slender-footed sedge	FAC
Chamerion angustifolium	fireweed	FACU
Cirsium vulgare	bull thistle	FACU
Cortaderia jubata	pampus grass	FACU
Cynosurus echinatus	annual dogtail	NL
Cyperus eragrostis	tall flat-sedge	FACW
Cytisus scoparius	Scotch broom	NL
Daucus carota	Queen Anne's lace	FACU
Epilobium ciliatum	fringed willow herb	FACW
Festuca arundinacea	tall fescue	FAC
Festuca perennis	Italian ryegrass	FAC
Genista monspessulana	French broom	NL
Geranium dissectum	cutleaf geranium	NL
Glyceria declinata	Waxy manna grass	FACW
Helminthotheca echioides	bristly ox-tongue	FAC
Heterotheca echioides	bristly golden aster	NL
Holcus lanatus	velvet grass	FAC
Hypochaeris radicata	hairy cats-ear	FACU
Juncus bolanderi	Bolander's rush	OBL
Juncus bufonius	toad rush	FACW
Juncus effuses	common lamp-rush	FACW
Juncus occidentalis	western rush	FACW
Leucanthemum vulgare	oxeye daisy	FACU
Lotus corniculatus	birds-foot trefoil	FAC
Medicago polymorpha	burclover	FACU
Mentha pulegium	pennyroyal	OBL
Oenanthe sarmentosa	Water parsley	OBL
Parentucellia viscosa	yellow glandweed	FAC
Picea sitchensis	Sitka spruce	FAC
Plantago lanceolata	English plantain	FACU
Polygonum aviculare	prostrate knotweed	NL
Polystichum munitum	sword fern	FACU
Pseudotsuga menziesii	Douglas fir	FACU
Ranunculus repens	creeping buttercup	FAC
Raphanus sativus	wild radish	NL
Rubus armeniacus	Himalayan blackberry	FAC
Rubus ursinus	California dewberry	FACU

Table C-1
Plants Observed at Wetland Pits January 17, 24, and 25, 2017 and February 9, 2018
Royal Gold, Glendale, California

Scientific Name	Common Name	Indicator 2016[1]
Rumex crispus	curly dock	FAC
Salix lasiolepis	arroyo willow	FACW
Salix lasiandra	Pacific willow	FACW
Sambucus racemosa	red elder	FACU
Scirpus microcarpus	panicled bulrush	OBL
Sonchus asper	prickly sow thistle	FACU
Stachys ajugoides	bugle hedgenettle	OBL
Taraxacum officinale	Common dandelion	FACU
Trifolium hybridium	alsike clover	FAC
Trifolium repens	white clover	FAC
Trifolium subterraneum	subterraneum clover	NL
Vicia hirsuta	tiny vetch	NL
Vicia sativa	spring vetch	UPL
Zeltnera muehlenbergii	Monterey mountain pink	FACW

1. Indicators are abbreviated as follows:
   OBL: Obligate
   FACW: Facultative
   FAC: Facultative
   FACU: Facultative upland
   UPL: Upland
   NL: Not listed

Wetland Determination Data Forms

4

Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/17/17

Applicant/Owner: State: CA Sampling Point: TP1U

Investigator(s): Joseph Saler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): Fluvial plain Local relief (concave, convex, none): none Slope (%): 0-5

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: humboldt

Soil Map Unit Name: Timmons & Lepoil 0-2% NWI classification: PEMC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: site visit after largest storm event in 20 yrs (1/11/17)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Lotus corniculatus	7		FAC
2. Raphanus sativus	1		NL
3. Trifolium repens	1		FAC
4. Helminthotheca echioides	2		FAC
5. Trifolium hybridum	4		FAC
6. Vicia hirsuta	1		NL
7. Juncus bufonius	15	✓	FACW
8. Festuca arundinacea	15	✓	FAC
9. Sonchus asper	1		FACU
10. Poa sp. (sprouts)	10		N/A
11. Polygonum aviculare	1		NL
12. Geranium dissectum	1		NL
13. Hypochaeris radicata	1		FACU
2.			
% Bare Ground in Herb Stratum 40%	60 = Total Cover		30/12

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Area highly manipulated, showing evidence of past soil movement and vegetation removal

SHN Consulting Engineers & Geologists, Inc.

SOIL

Sampling Point: TP14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-17"	10YR 3/1	100					gr SCL	Fill
17-18	10YR 6/6	100					SL	Fill
18-25	10YR 3/2	100					grSL	Fill w/ woody debris @ 25"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Fill as evidenced by gravel, buried clay layer & woody debris

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): 22

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 5-25

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water table @ 22" after 20 minutes of augering. Hydrology saturation observed after largest rainfall w/in several years (storm ending 1/11/17)

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/17/17

Applicant/Owner: State: CA Sampling Point: TP24

Investigator(s): Joseph Saler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): Fluvial plain Local relief (concave, convex, none): none Slope (%): 0-5

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: humboldt

Soil Map Unit Name: Timmons & Lepoil 0-2% NWI classification: PEMIC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: site visit after largest storm event in 20 years (1/11/17)

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Juncus bufonius	15	✓	FACW
2. Lotus corniculatus	3		FAC
3. Helminthotheca echioides	1		FAC
4. Trifolium repens	2		FAC
5. Sonchus asper	1		FACU
6. Raphanus sativus	1		NL
7. Trifolium hybridum	5		FAC
8. Vicia sativa	1		UPL
9. Festuca arundinacea	10	✓	FAC
10. Polygonum aviculare	1		NL
11. Vicia hirsuta	1		NL
12. Geranium dissectum	1		NL
13.			
14.			
	42 = Total Cover		21/84

% Bare Ground in Herb Stratum 58%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Area highly manipulated, showing evidence of post soil movement and vegetation removal

SOIL

Sampling Point: TP24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-25	10YR 3/2	100					gr. SL	Fill with occassional burnt woody debris

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks: Piece of 3" plastic Royal Gold matting @ 18" depth.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 6-25"

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: site visit after very large storm w/in 7 days. Severe local flooding

Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/17/17

Applicant/Owner: State: CA Sampling Point: TP34

Investigator(s): Joseph Sayer & Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial plain Local relief (concave, convex, none): none Slope (%): 0-5

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Timmons & Lepoil 0-2% slope NWI classification: PEMIC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: site visit after largest storm event w/in 20 years (1/11/17).

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Cyperus eragrostis	3	✓	FACW
2. Holcus lanatus	0.5		FAC
3. Hypochaeris radicata	0.5		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	4 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover 2 / 0.8		

% Bare Ground in Herb Stratum 96%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Area highly manipulated, showing recent soil movement and vegetation removal. - Current vegetation not a good indication of conditions on site.

SOIL

Sampling Point: TP34

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-25	2.5YR 5/8	40					SCL	Fill w/ 0 cc. 2" woody debris
	7.5YR 5/6	60						
25-26	7.5YR 3/2	100					grSL	Fill

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks: Recently disturbed site, < 1/1 in one growing season. Not normal circumstances for soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): 22

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): 3-26

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: site visit followed largest storm event in 20 years

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/17/17

Applicant/Owner: State: CA Sampling Point: TP4U

Investigator(s): Joseph Sater, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial plain Local relief (concave, convex, none): none Slope (%): 0-5

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Timmons & Lepoil 0-2% NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: site visit after largest storm event w/in 10 years (1/11/17)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Holcus lanatus	20	✓	FAC
2. Juncus effusus	12		FACW
3. Lotus corniculatus	18	✓	FAC
4. Festuca arundinacea	3		FAC
5. Hypochaeris radicata	2		FACU
6. Rumex crispus	1		FAC
7. Geranium dissectum	1		NL
8. Stachys ajugoides	2		Obl
9. Vicia hirsuta	3		NL
10.			
11.	62	= Total Cover	31 / 12.4
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 38%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SHN Consulting Engineers & Geologists, Inc.

SOIL

Sampling Point: TP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	5YR 5/8	30					grSCL	Fill with cobbles. colors abrupt juxta position
	10YR 4/3	70						
8-18	10YR 3/2	90					grSL	Fill w/ nodules of compressed peds
	10YR 6/4	10						
18-21	7.5YR 4/4	99	7.5YR 5/6	1			SiL	at or nearing native soil? or old compressed fill - see charcoal in peds

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks: Fill to 18" on top of older, highly compacted fill w/ charcoal

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes X No _____ Depth (inches): 6"

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0-6"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 2/9/18

Applicant/Owner: State: CA Sampling Point: TP 5 W

Investigator(s): Joseph Saler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR): LRR-A MLRA-4B Lat: 40.9040 Long: -124.0298 Datum: Humboldt

Soil Map Unit Name: Lepoil - Candy mtn 2-5% slopes NWI classification: PEMIC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5)			
1. Mentha pulegium	46	✓	OBL
2. Cyperus eragrostis	3		FACW
3. Rumex crispus	1		FAC
4. Lotus corniculatus	1		FAC
5. Festuca arundinacea	5		FAC
6. Scirpus microcarpus	8		OBL
7. Agrostis stolonifera	10		FAC
8. Glyceria declinata	6		FACW
9. Hypochaeris radicata	1		FACU
10.			
11.	81	= Total Cover	40.5 / 16.2
Woody Vine Stratum (Plot size: 5)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 19%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SHN Consulting Engineers & Geologists, Inc.

SOIL

Sampling Point: TP 5W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-5	10YR 4/2	100					L	w/charcoal debris
5-18	2.5Y 6/1	60	10YR 5/8	40	RM	M	CL	
18-24	2.5Y 6/1	100					SICL	burned soil w/ bank

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes X No ___ Depth (inches): 7in

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 4in

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/17/17

Applicant/Owner: State: CA Sampling Point: TP5U

Investigator(s): Joseph Sisler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial plain Local relief (concave, convex, none): none Slope (%): 0-5

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Timmons & Lepoil 0-2% NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Site visit after largest storm event in 20 years (1/11/17)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Raphanus sativus	15	✓	NL
2. Juncus bufonius	10	✓	FACW
3. Festuca arundinacea	12	✓	FAC
4. Trifolium hybridum	3		FAC
5. Vicia hirsuta	1		NL
6. Rumex crispus	1		FAC
7. Poa sp. (sprouts)	5		N/A
8. Geranium dissectum	1		NL
9. Hypochaeris radicata	1		
10.			
11.			
	49 = Total Cover		24.5 / 9.8
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 51%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP5U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-22	2.5YR 3/2	100					vgr SL	Fill-young/recent loose over
22-25	10YR 5/4	15					CL	Fill-compacted w/ roots
	2.5YR 5/4	10						& woody/herb debris
	2.5YR 5/3	70						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks: Juncus roots @ 13" (buried, not in situ)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ____ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): 0-25

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: within 1 week of extremely large rain event w/ severe local flooding.

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold | City/County: Humboldt | Sampling Date: 1/17/17

Applicant/Owner: | State: CA | Sampling Point: TP6W

Investigator(s): Joseph Saler, Cindy Wilcox | Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial plain | Local relief (concave, convex, none): none | Slope (%): 0-5

Subregion (LRR): LRR A | Lat: 40.9040 | Long: -124.0208 | Datum: Humboldt

Soil Map Unit Name: Timmons & Lepoil 0-2% | NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Site visit after largest storm event within 20 years (1/11/17)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1. Festuca arundinacea	35	✓	FAC
2. Cynosurus echinatus	5		NL
3. Trifolium hybridum	4		FAC
4. Hypochaeris radicata	3		FACU
5. Lotus corniculatus	1		FAC
6. Juncus balticus	2		OBL
7. Holcus lanatus	4		FAC
8. Poa sp. (sprouts)	30		N/A
9. Moss mat	2		N/A
10.			
11.			
	86 = Total Cover		43 / 17.2
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 14

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP6W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 5/3	100					cobbly/gr LS	Fill
12-18	10YR 3/1	100					gr L	Fill / Recent?
18-19	Gley 2.5/N	100					gr. S	Fill
19-21	2.5Y 6/6	50					SCL	Occ. gravel compacted fill - not colors of native soils seen in creek
	2.5Y 6/4	50						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ✓ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks: 0-12" saturated, draining downwards. Recent fill above 19 inches. Overcast/raining. Not normal circumstances (< 3-5 yrs gravel placement of LS & Sandier)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0-21

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: site visit after severe flooding storm.

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 2/9/18

Applicant/Owner: State: CA Sampling Point: TP 6.4

Investigator(s): Joseph Saler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 3%

Subregion (LRR): LRR-A MLRA-4B Lat: 40.9040 Long: -124.0298 Datum: Humboldt

Soil Map Unit Name: Timmons : Loeoil 0-2% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Transition from 3parameter wetland (TP6) to upland

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5)			
1. Geranium dissectum	3		NL
2. Festuca arundinacea	28	✓	FAC
3. Lotus corniculatus	6		FAC
4. Hypochaeris radicata	5		FACU
5. Parentucelia viscosa	1		FAC
6. Trifolium subterraneum	3		NL
7. Holcus lanatus	4		FAC
8. Vicia sativa	1		UPL
9. Festuca perennis	42	✓	FAC
10.			
11.			
	93% = Total Cover		46.5 / 18.6
Woody Vine Stratum (Plot size: 5)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 7%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP64

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/2	70					SCL	Fill w/ pockets of lower level
	w/ pockets of	5%						material & burned wood
	10YR 6/2	65					SCL	debris
	10YR 4/2	20	30%					
	7.5YR 5/8	15						
14-18	10YR 6/3	65	7.5YR 5/8	15	RM	M	SCL	
	10YR 4/2	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ___ No X

Remarks: Transitional

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): 11

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 9

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Transitional

Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/17/17

Applicant/Owner: State: CA Sampling Point: TP7U

Investigator(s): Joseph Sater, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial plain Local relief (concave, convex, none): none Slope (%): 0-5

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Lepoil-Candymountain 2-15% NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Site visit after largest storm event w/in 20 years (1/11/17)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Festuca arundinacea	80	✓	FAC
2. Anthoxanthum odoratum	12		FACU
3. Geranium dissectum	2		NL
4. Trifolium hybridum	3		FAC
5. Lotus corniculatus	3		FAC
6. Parentucellia viscosa	2		FAC
7. Vicia Sativa	4		UPL
8. Hypochaeris radicata	1		FACU
9. Vicia hispidula	1		NL
10. Sonchus asper	2		FACU
11.			
	110 = Total Cover		55/22
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SHN Consulting Engineers & Geologists, Inc.

SOIL

Sampling Point: TP14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-21	10YR 5/6	30					cobbly gr. SCL	Fill w/ occ cobble & woody debris
	10YR 4/4	70						many sources of fill
21-27	10YR 3/2	100					SCL	Fill charage - burned charcoal @ surface - at native surface?

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No X

Remarks: Fill w/ a lot of woody debris & different fill material. colors representative of fill, no indication of hydric soil colors.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ____ Depth (inches): 19"

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): 0-27"

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: water saturation - experienced severe local flooding & rainfall w/in past week

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/17/17

Applicant/Owner: State: CA Sampling Point: TP84

Investigator(s): Joseph Saler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): Fluvial plain Local relief (concave, convex, none): none Slope (%): 0-5

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Timmons & Lepori 0-2% NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: site visit after largest storm event w/in 20 years (1/11/17)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Cyperus eragrostis	10	✓	FACW
2. Hypochaeris radicata	1		FACU
3. Agrostis stolonifera	22	✓	FAC
4. Lotus corniculatus	2		FAC
5. Mentha pulegium	1		Obl
6. Juncus bolanderi	1		Obl
7. Juncus occidentalis	1		FACW
8.			
9.			
10.			
11.			
	38 = Total Cover		19 / 1.6
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 62 (50% ponded water)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ____	x 1 =	____
FACW species ____	x 2 =	____
FAC species ____	x 3 =	____
FACU species ____	x 4 =	____
UPL species ____	x 5 =	____
Column Totals: ____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Manipulated fill, with clay placed on top of gravel. Water ponding atop clay. Vegetation sparse on compacted clay.

SOIL

Sampling Point: TP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	7.5YR 6/8	40					SiCl	Fill. Water perched
	10YR 4/3	60						
9-23	10YR 4/2	90					cobbly gr LS	fill Occ. cobbles w/ burned w/ abt woody debris w/ nodules of 7.5YR 6/8
	7.5YR 6/8	10						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ~~Histosol (A1)~~
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- ~~Sandy Redox (S5)~~
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1) **(except MLRA 1)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ~~2 cm Muck (A10)~~
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks: Water perched on 0-9" clay. Fill underneath 9-23 has no saturation. The 7.5 YR nodules not hydric indicator - rather material incorporated from other fill source.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- ✓ Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Stunted or Stressed Plants (D1) **(LRR A)**
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Raised Ant Mounds (D6) **(LRR A)**
- Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): 21

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): 0-9

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/24/17

Applicant/Owner: State: CA Sampling Point: TP94

Investigator(s): Joseph Saler & Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial plain Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Lepoil-Candy mountain 2-15% NWI classification: PEMIC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: Above average monthly rainfall with local flooding in January. Rain on preceeding day.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Cytisus scoparius	35	✓	NL
2. Agrostis stolonifera	35	✓	FAC
3. Holus lanatus	2		FAC
4. Plantago lanceolata	3		FACU
5. Leucanthemum vulgare	2		FACU
6. Genista monspessulana	1		NL
7. Lotus corniculatus	1		FAC
8. Hypochaeris radicata	1		FACU
9. Anthoxanthum odoratum	4		FACU
10.			
11.	84 = Total Cover		42/16.8
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 16%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: TP9U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	50					SCL	Fill mixed w/ native
	7.5YR 5/6	30						soil. No redox. soil reforming
	2.5YR 4/6	20						on old surface
7-22	7.5YR 5/6	60					CL	Native material
	2.5YR 4/6	40						in situ

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Heavy flooding in prior weeks

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/24/17

Applicant/Owner: State: CA Sampling Point: TP104

Investigator(s): Joseph Saler & Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): Hillslope (excavated) Local relief (concave, convex, none): concave Slope (%): 0-5

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Lepoil - Espa - Candymountain 15-50% NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Above average monthly rainfall with local flooding in January. Rain on preceeding day.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 5ft)			
1. Alnus rubra	90	✓	FAC
2. Picea sitchasis	8		FAC
3. Pseudotsuga menziesii	2		FACU
4.			
5.			
	100 = Total Cover		50/20
Herb Stratum (Plot size: 5ft)			
1. Cortaderia jubata	15	✓	FACU
2. Polystichum munitum	2		FACU
3. Carex leptopoda	1		FAC
4. Juncus leffusus	2		FACW
5. Scirpus microcarpus	2		Obl
6. Holcus lanatus	5	✓	FAC
7. Medicago polymorpha	1		FACU
8.			
9.			
10.			
11.			
	29 = Total Cover		14.5/5.8
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 71%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 4/6	40					grSCL	Fill w/ gravel & wood
	5YR 4/6	30						pieces
	7.5YR 4/6	30						
13-23	5YR 4/6	70					C	Native? interface
	7.5YR 5/6	25						
	7.5YR 7/4	5						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks: Lower portion of pit difficult to investigate due to high water table. Native interface?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- X Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 1

Water Table Present? Yes ✓ No ____ Depth (inches): 9

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0-23

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/24/17

Applicant/Owner: State: CA Sampling Point: TP114

Investigator(s): Joseph Saler & Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 0-3

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: humbolat

Soil Map Unit Name: Lepoil-Espa-Candymountain 15-50% NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Above average monthly rainfall with local flooding in January. Rain on preceding day.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1. Alnus rubra	60	✓	FAC
2.			
3.			
4.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. Rubus armeniacus	1	✓	FAC
2.			
3.			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: _____)			
1. Juncus effusus	15	✓	FACW
2. Juncus balticus	1		Obl
3. Holcus lanatus	12	✓	FAC
4. Hypochaeris radicata	8		FACU
5. Lotus corniculatus	5		FAC
6.			
7.			
8.			
9.			
10.			
11.			
	41 = Total Cover		20.5 / 8.2
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 59

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: TP11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/6	20					SiCL	Fill w/ disturbed w/ woody
	10YR 3/2	70						debris & rounded/
	7.5YR 5/6	10						angular gravel
5-11	7.5YR 5/6	80						
	5YR 5/6	20					C	Native or much older
								compacted fill transition
11-21	5YR 4/6	80					C	Native
	7.5YR 5/6	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): 21"

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0-21

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Heavy above-average rain fall & local flooding in January.

Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/24/17

Applicant/Owner: State: CA Sampling Point: TP124

Investigator(s): Joseph Saler & Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial plain Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Lepoil - Candy mountain 2-15% NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: Above average monthly rainfall with local flooding in January. Rain 1/23/17

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Juncus effusus	45	✓	FACW
2. Parentucellia viscosa	2		FAC
3. Holcus lanatus	10		FAC
4. Lotus corniculatus	12		FAC
5. Hypochaeris radicata	10		FACU
6. Cynodon dactylon	5		FACW
7. Medicago polymorpha	10		FACU
8.			
9.			
10.			
11.			
	94 = Total Cover		47 / 18.8
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 6%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP12a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100					grSL	Fill w/occ. cobble
12-21	10YR 6/8	65					sic	Native
	7.5YR 5/8	35						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): 21

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0-12"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Site preceeded by local flooding & above-average rainfall in January. TP next to small drainage/seepage

Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/24/17

Applicant/Owner: State: CA Sampling Point: TP13W

Investigator(s): Joseph Saler & Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: humbolat

Soil Map Unit Name: Lepoil - Candymountain 2-15% NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Above average monthly rainfall with local flooding in January. Rain 1/23/17

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	80	✓	FAC
2.			
3.			
4.			
	80 = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Rubus armeniacus	10	✓	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: ____)			
1. Juncus effusus	65	✓	FACW
2. Holcus lanatus	5		FAC
3. Vicia sativa	1		UPL
4. Geranium dissectum	0.5		NL
5. Heterotheca echioides	0.5		NL
6.			
7.			
8.			
9.			
10.			
11.			
	72 = Total Cover		36 / 14.4
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 28%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- X 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP13W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-11	10YR 3/2	100					grSL	Fill w/cobbles
11-20	10YR 3/1	93	7.5YR 5/8	7	rm	pl	CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 10

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0-20

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Above-average rainfall & flooding in January.

Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/25/17

Applicant/Owner: State: CA Sampling Point: TP14U

Investigator(s): Joseph Saler & Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial plain Local relief (concave, convex, none): none Slope (%): 1-5

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Lepoil-Candy mountain 2-15% NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Above average monthly rainfall with local flooding in January.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Rubus armeniacus	3	✓	FAC
2. Alnus rubra	2	✓	FAC
3.			
4.			
5.			
	5 = Total Cover		2.5
Herb Stratum (Plot size: ____)			
1. Festuca arundinacea	70	✓	FAC
2. Daucus carota	10		FACU
3. Juncus effusus	5		FACW
4. Geranium dissectum	1		NL
5. Holcus lanatus	10		FAC
6. Cirsium vulgare	1		FACU
7. Vicia sativa	1		UPL
8.			
9.			
10.			
11.			
	98 = Total Cover		49 / 19.6
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 2%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	10YR 3/2	99					gr SL	Fill w/ char & dead plant
	10YR 6/3	1						material mixed in.
8-23	5B 8/1	8					CL	Fill - nodules of gley
	10YR 6/8	40						& charred material
	10YR 4/2	52						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ___ No ✓

Remarks: Transition zone

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): 14-23

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Prior above-average rainfall w/ local flooding in January. The alpha-alpha-d not in correct season for primary indicator

Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/25/17

Applicant/Owner: State: CA Sampling Point: TP1SW

Investigator(s): Joseph Saler & Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial drainage Local relief (concave, convex, none): concave Slope (%): 2-6

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Timmons & Lepoil 0-2% slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Above average monthly rainfall with local flooding in January.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Alnus rubra	80	✓	FAC
2.			
3.			
4.			
5.			
	80 = Total Cover		
Herb Stratum (Plot size: ____)			
1. Festuca arundinacea	15	✓	FAC
2. Holcus lanatus	5		FAC
3. Cirsium dissectum	0.5		NL
4. Heterotheca echioides	0.5		NL
5. Chamerion angustifolium	0.5		FACU
6. Agrostis stolonifera	4		FAC
7.			
8.			
9.			
10.			
11.			
	25.5 = Total Cover		~~12.5~~ 5.1
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 74.5 (leaf duff litter)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- X 2 - Dominance Test is >50%
- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP15W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/2	100					SL	Fill
7-10/12	7.5YR 6/8	70					SL	Fill
10/12-18	2.5Y 6/1	30					SL	
	5B 6/1	70						
	5B 4/1	20						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✓ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ✓ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks: grey zone at 10" on east side of pit, 12" on west side. These are estimates because of high 7" water table obscuring horizon location

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ✓ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 7

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): 0-18

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Heavy above-average rain fall & flooding in January.

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/25/17

Applicant/Owner: State: CA Sampling Point: TP16W

Investigator(s): Joseph Saler & Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 5-10

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: 7 Lepoil-Candijmtn. 2-5% slopes NWI classification: PEMIC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Above average monthly rainfall with local flooding in January.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	30	✓	FACW
2.			
3.			
4.			
	30 = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Rubus armeniacus	7	✓	FAC
2.			
3.			
4.			
5.			
	7 = Total Cover		
Herb Stratum (Plot size: ____)			
1. Medicago polymorpha	35	✓	FACU
2. Festuca arundinacea	8		FAC
3. Holcus lanatus	10		FAC
4. Scirpus microcarpus	5		OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	58 = Total Cover		29 / 11.6
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 42

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP16W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4/6	10YR 4/2	100					L	w/gravel
4/6-16	10YR 5/3	85	7.5YR 5/8	15			SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✓ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Bottom of 1st horizon averages 4-6 lowerslope = 4", upperslope = 6"
water table too high to excavate 7/6". Transition.
Log pond edge

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 4"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0-16

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 1/25/17

Applicant/Owner: State: CA Sampling Point: TP17U

Investigator(s): Joseph Saler & Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): fluvial plain Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): LRR A Lat: 40.9040 Long: -124.0208 Datum: Humboldt

Soil Map Unit Name: Timmons & Lepoil 0-2% NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Above average monthly rainfall with local flooding in January. Constructed catchment basin

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	50	✓	FAC
2. Salix lasiolepis	20	✓	FACW
3.			
4.			
	70 = Total Cover		35/14
Sapling/Shrub Stratum (Plot size: ____)			
1. Rubus armeniacus	3	✓	FAC
2.			
3.			
4.			
5.			
	3 = Total Cover		
Herb Stratum (Plot size: ____)			
1. Medicago polymorpha	45	✓	FACU
2. Cyperus eragrostis	5		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50 = Total Cover		25/10
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 50%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: loose recently deposited silt/soil

SOIL

Sampling Point: TP17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-16	10YR 2/2	100					L	Sediment/roots/woody debris
16-22	10YR 6/1	15					SL	
	7.5YR 5/8	80						
	2.5Y 6/2	5						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks: Drainage catchment w/sediment building up during wetseasons.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 5

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0-22

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: above-average heavy rainfall & flooding in January.

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 2/9/18

Applicant/Owner: State: CA Sampling Point: TP 18 U

Investigator(s): Joseph Saler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): Hillslope (excavated) Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR): LRR-A MLRA-4B Lat: 40.9040 Long: -124.0298 Datum: Humboldt

Soil Map Unit Name: Lepoil-Candymountain 2-15% slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: In a depression enclosed by berms. Deep

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	30	✓	FAC
2.			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	10	✓	FAC
2.			
3.			
4.			
5.			
	10	= Total Cover	
Herb Stratum (Plot size: 5)			
1. Juncus effusus	15		FACW
2. Holcus lanatus	30	✓	FAC
3. Anthoxanthum odoratum	22	✓	FACU
4. Taraxicum officinale	3		FACU
5. Lotus corniculatus	2		FAC
6. Epilobium ciliatum	1		FACW
7. Vicia sativa	1		UPL
8. Festuca arundinacea	4		FAC
9.			
10.			
11.			
	78	= Total Cover	39 / 15.6
Woody Vine Stratum (Plot size: 5)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 22 (leaf litter)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP 18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/2	100					SiL	charcoal & brick
5-24	2.5Y 6/3	67	10YR 5/6	23	RM	PL	CL	
	2.5Y 7/1	10						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No ✓

Remarks: depression?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes ____ No X Depth (inches): 16 in

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): Surface

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 2/9/18

Applicant/Owner: State: CA Sampling Point: TP19u

Investigator(s): Joseph Saler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 0-1

Subregion (LRR): LRR-A MLRA-4B Lat: 40.9040 Long: -124.0298 Datum: Humboldt

Soil Map Unit Name: Lepoil - Candy mountain 2-15% slope NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks: On access road

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	10	✓	FAC
2.			
3.			
4.			
	10 = Total Cover		

Sapling/Shrub Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: 5)			
1. Hypochaeris radicata	20	✓	FACU
2. Holcus lanatus	10	✓	FAC
3. Vicia Sativa	1		UPL
4. Anthoxanthum odoratum	12	✓	FACU
5. Mentha pulegium	1		Obl
6. Zeltneria Muehlenbergii	2		FACW
7. Lotus Corniculatus	3		FAC
8.			
9.			
10.			
11.			
	49 = Total Cover		24.5 / 9.8

Woody Vine Stratum (Plot size: 5)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 51 (gravel)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point: TP19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/2	90	10% pockets of sand fill				gr. SL	accessroad fill mixed
3-20	2.5Y 5/3	35	7.5YR 5/8	5	RM	M	CL	
	10YR 5/6	60						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 2/9/2018

Applicant/Owner: State: CA Sampling Point: TP204

Investigator(s): Joseph Saler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR-A MLRA-4B Lat: 40.9040 Long: -124.0298 Datum: Humboldt

Soil Map Unit Name: Timmons & Lepoil 0-2% NWI classification: PEM 1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5)			
1. Cyperus eragrostis	18	✓	FACW
2. Mentha pulegium	15	✓	OBL
3. Alisma triviale	1		OBL
4. Lotus corniculatus	5		FAC
5. Glyceria declinata	12	✓	FACW
6. Juncus effusus	2		FACW
7. Hypochaeris radicata	2		FACU
8. Juncus	4		
9.			
10.			
11.			
	59 = Total Cover		29.5 / 11.8
Woody Vine Stratum (Plot size: 5)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 41%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	5YR 5/6	55					SiCL	Fill
	2.5YR 4/8	10						
	7.5YR 6/8	35						
9-15	10YR 4/2	100					SiL	w/ charcoal debris
15-24	2.5Y 6/1	65	10YR 5/8	35	RM	M	CL	Native?

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes X No ___ Depth (inches): 8.5 in

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 7 in

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 2/9/18

Applicant/Owner: State: CA Sampling Point: TP 214

Investigator(s): Joseph Saler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 2%

Subregion (LRR): LRR-A MLRA-4B Lat: 40.9040 Long: -124.0298 Datum: Humboldt

Soil Map Unit Name: Lepoil-Espa-Candyman-tain 15-50% Slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiandra	30%	✓	FACW
2. Alnus rubra	35%	✓	FAC
3. Picea sitchensis	20%	✓	FAC
4.			
	85	= Total Cover	42.5/17
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	5	✓	FAC
2. Rubus ursinus	8	✓	FACU
3. Sambucus racemosa	1		FACU
4.			
5.			
	14	= Total Cover	7/2.8
Herb Stratum (Plot size: 5)			
1. Cyperus eragrostis	1		FACW
2. Rumex crispus	1		FAC
3. Polystichum munitum	10	✓	FACU
4. Ranunculus repens	12	✓	FAC
5. Oenanthe sarmentosa	5		OBL
6. Juncus effusus	1		FACW
7. Carex leptopoda	4		FAC
8.			
9.			
10.			
11.			
	34	= Total Cover	17/6.8
Woody Vine Stratum (Plot size: 5)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 66

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 71% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP 21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/2	100					SiCL	
6-16	5YR 5/6	60					CL	
	10YR 6/3	40						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- X Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): _____

Water Table Present? Yes X No ____ Depth (inches): 2 inches

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): Surface

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SHN Consulting Engineers & Geologists, Inc.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Royal Gold City/County: Humboldt Sampling Date: 2/9/2018

Applicant/Owner: State: CA Sampling Point: TP22W

Investigator(s): Joseph Saler, Cindy Wilcox Section, Township, Range: S 13 T 06N R 01E

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): LRR-A MLRA-4B Lat: 40.9040 Long: -124.0298 Datum: Humboldt

Soil Map Unit Name: Lepoil-Candymountain 2-15% slope NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiandra var. lasiandra	80	✓	FACW
2. Alnus rubra	15		FAC
3.			
4.			
	95 = Total Cover		47.5 / 19
Sapling/Shrub Stratum (Plot size: 5)			
1. Rubus armeniacus	2	✓	FAC
2. Rubus ursinus	1	✓	FACU
3.			
4.			
5.			
	3 = Total Cover		1.5 / 0.6
Herb Stratum (Plot size: 5)			
1. Juncus effusus	5	✓	FACW
2. Ranunculus repens	4	✓	FAC
3. Scirpus microcarpus	1		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10 = Total Cover		5 / 2
Woody Vine Stratum (Plot size: 5)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 90%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- X 2 - Dominance Test is >50%
- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: TP22W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100	organic material				muck	organic layer
3-11	2.5Y 4/1	100					or l. SL	fill
11-17	10YR 3/2	94	7.5YR 5/6	6	RM	M		
17-19	5YR 5/6	60						
	10YR 6/3	40						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✓ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ✓ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks: alpha-alpha dipyridyl positive reaction (can be used w/in normal rainfall climate)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No ___ Depth (inches): 10"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 8-19"

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

OHWM-pt2 **OHWM Delineation Cover Sheet** Page 1 of 2

Project: Royal Gold **Date:** 1/24/17

Location: Glendale, Humboldt County **Investigator(s):** Joseph Saler

Project Description:

Permit existing soil processing operations on-site, as well as future expansion plans

Describe the river or stream's condition (disturbances, in-stream structures, etc.):

Small second order stream channelized and moved during 1950's mill development. The western bank has been excavated while the eastern side has a berm designed to keep flood waters out of the mill property. High fine sediment deposition within the channel. Well developed tree canopy.

Off-site Information

Remotely sensed image(s) acquired? ☐ **Yes** ☐ **No** [If yes, attach image(s) to datasheet(s) and indicate approx. locations of transects, OHWM, and any other features of interest on the image(s); describe below] Description:

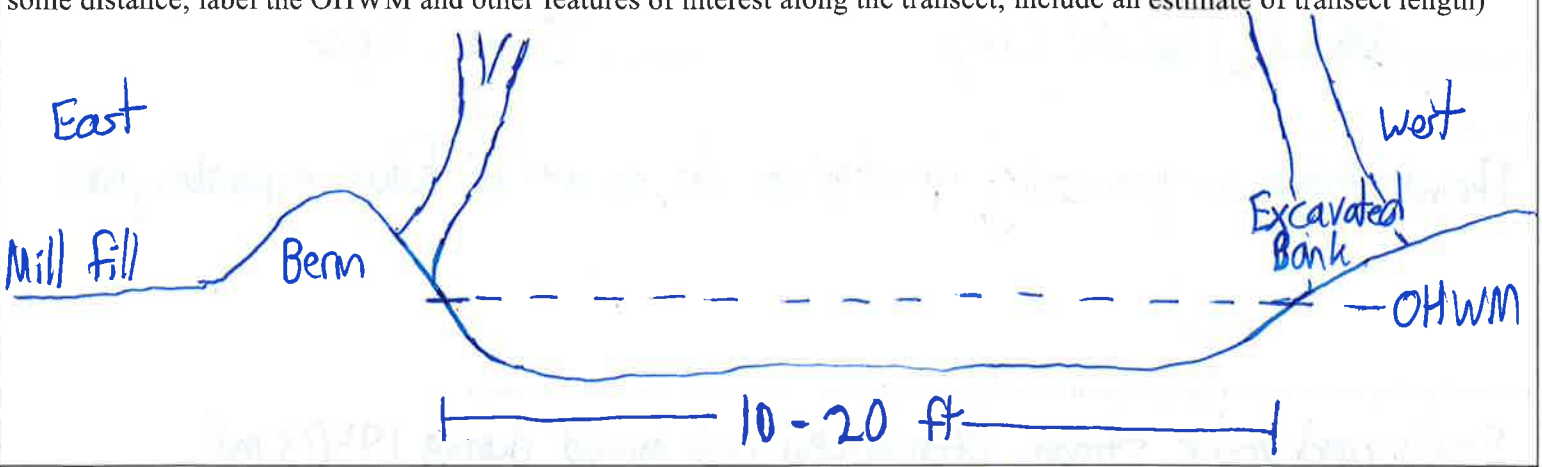
Hydrologic/hydraulic information acquired? ☐ **Yes** ☒ **No** [If yes, attach information to datasheet(s) and describe below.] Description:

List and describe any other supporting information received/acquired:

Topographic map aided in development of channel OHWM delineation

Instructions: Complete one cover sheet and one or more datasheets for each project site. Each datasheet should capture the dominant characteristics of the OHWM along some length of a given stream. Complete enough datasheets to adequately document up- and/or downstream variability in OHWM indicators, stream conditions, etc. Transect locations can be marked on a recent aerial image or their GPS coordinates noted on the datasheet.

Transect (cross-section) drawing: (choose a location that is representative of the dominant stream characteristics over some distance; label the OHWM and other features of interest along the transect; include an estimate of transect length)



Break in Slope at OHWM: ☐ Sharp (> 60°) | ☐ Moderate (30–60°) | ☒ Gentle (< 30°) | ☐ None

Notes/Description:
Excavated channel that has silted in with wide gently sloping bottom.

Sediment Texture: Estimate percentages to describe the general sediment texture above and below the OHWM

	Clay/Silt <0.05mm	Sand 0.05 – 2mm	Gravel 2mm – 1cm	Cobbles 1 – 10cm	Boulders >10cm	Developed Soil Horizons (Y/N)
Above OHWM	70	5	4	1	0	Y
Below OHWM	85	9	5	1	0	

Notes/Description:
Above high water mark wood chunks abundant.

Vegetation: Estimate absolute percent cover to describe general vegetation characteristics above and below the OHWM

	Tree (%)	Shrub (%)	Herb (%)	Bare (%)
Above OHWM	80	75%	25%	5%
Below OHWM	80	0	25% (hydrophytes)	75%

Notes/Description:
Well developed tree canopy shades the entire channel. Shrub layer extends to OHWM Only hydrophytes observed lower than OHWM.

Other Evidence: List/describe any additional field evidence and/or lines of reasoning used to support your delineation
A slight break in slope on the western bank, not associated with excavation of the channel, and the change in vegetation helped establish the OHWM. Soil texture was similar above and below (probably as a result of past excavation) however slightly higher silt below OHWM.

Eureka, CA | Arcata, CA | Redding, CA | Willits, CA | Coos Bay, OR | Klamath Falls, OR

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Wetland Mitigation and Monitoring Plan Addendum 1 (SHN, 2020)

3

Wetland Mitigation and Monitoring Plan Addendum 1

Royal Gold Premium Potting Soils, LLC
Assessor's Parcel Numbers:
516-101-040, 516-101-064, 516-101-068, 516-101-084, and 516-111-062
Glendale, California

Prepared for:
Royal Gold Premium Potting Soils, LLC

Revision 1

November 2020

016098.006

Phone: (707) 822-5785 **Email:** info@shn-engr.com
Web: shn-engr.com * 1062 G Street, Suite I, Arcata, CA 95521-5800

Wetland Mitigation and Monitoring Plan Addendum 1

Revision 1

Royal Gold Premium Potting Soils, LLC
Assessor's Parcel Numbers:
516-101-040, 516 101-064, 516-101-068, 516-101-084, and 516-111-062
Glendale, California

Prepared for:
Royal Gold Premium Potting Soils, LLC

Prepared by:

1062 G Street, Ste. I
Arcata, CA 95521-5800
707-822-5785

November 2020

QA/QC: GCR___

Reference: 016098.006

Table of Contents

List of Illustrations

Abbreviations and Acronyms

Units of Measure

in.	inch
SF	square feet

Additional Terms

FAC	facultative wetland plant species
FACW	facultative wet wetland plant species
NR	no reference
OBL	obligate wetland plant species
Royal Gold	Royal Gold Premium Potting Soils, LLC
WMMP	Wetland Mitigation and Monitoring Plan

1.0 Introduction

This Wetland Mitigation and Monitoring Plan (WMMP) Addendum is submitted by SHN on behalf of Royal Gold Premium Potting Soils, LLC (Royal Gold) to supplement the 2019 WMMP for the Royal Gold proposed wetland mitigation project. This Addendum outlines an additional impact area, and proposed mitigation area, for incorporation into the 2019 WMMP.

The baseline assessment, project goals, project description, and other sections not found in this Addendum are the same as the original WMMP prepared for Royal Gold (SHN, 2019). The amended planting list is included as Appendix 1 and the original WMMP is included as Appendix 2 to this Addendum.

2.0 Project Mitigation Requirements

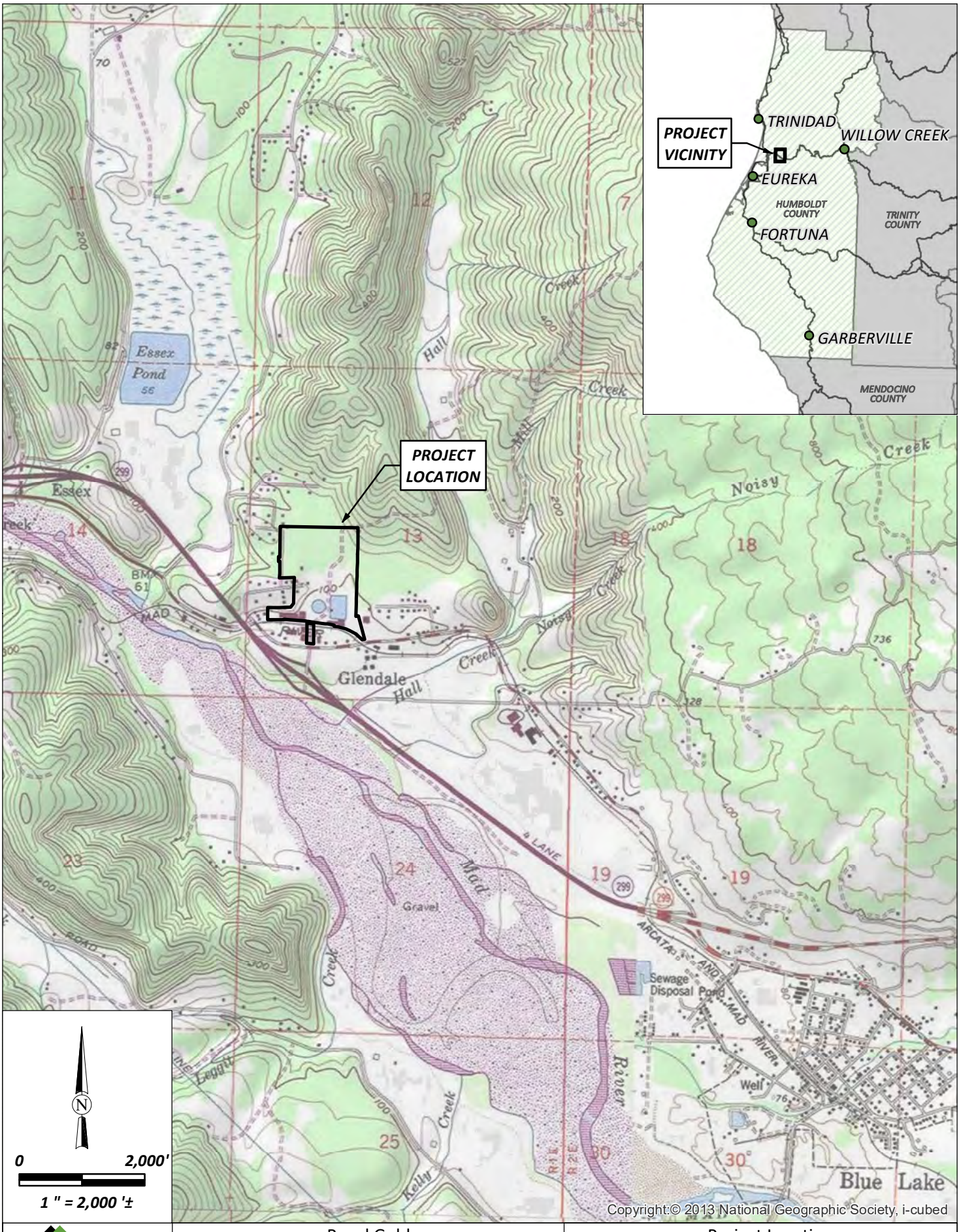
Approximately 3.2 acres, or 139,392 square feet (SF), of wetlands or other waters of the U.S. exist within the parcels containing the Royal Gold facility. This includes 2.86 acres of wetlands and 0.33 acres of other waters of the U.S (SHN, 2018). As described in the WMMP, the wetlands and drainages at the site were modified and impacted by past industrial activities. Of the 2.86 acres of wetlands, 1.32 acres have been recently impacted, or are proposed to be impacted, as outlined in the original WMMP. Table 1 outlines the impact areas as defined in the original WMMP. Figure 2 shows the location of the impact areas identified in the original WMMP.

Table 1. WMMP Wetland Mitigation Area Data
Royal Gold Premium Potting Soils, LLC
Glendale, CA

Impact Area	Surface Area (SF)[a]	Mitigation Area Proposed	Location	Coordinates
A	31,802	63,604	Central	40.901949°, -124.019869°
B	4,338	8,676	Central	40.901671°, -124.020537°
C	21,359	42,718	Central East	40.902401°, -124.018230°
Total	**57,499**	**114,998**		

[a] SF: square feet

The additional impact area proposed in this Addendum is approximately 0.27 acres, or 11,761 SF (see Table 2), and is labeled as Impact Area D on Figure 2. The additional wetland area proposed to be impacted includes a northern portion of the wetland associated with previously defined Impact Area C (see Figure 2). Impact Area D includes palustrine emergent persistent seasonally flooded wetland (SHN, 2018). This addition brings the estimated total impact to wetlands to 1.59 acres, or 69,260 SF. The existing impacted wetlands at the site (Impact Areas A and B) have primarily been used for stormwater management improvements. The additional wetland areas proposed to be impacted (Impact Areas C and D) will also be primarily used for stormwater management.



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SHN	Royal Gold Wetland Mitigation & Monitoring Plan (A.1/R.1) Glendale, Humboldt County, California	Project Location SHN 016098.006
	October 2020 | WMMP-A1r1_Fig1_ProjectLocation	Figure 1

Lat: 40.904486
Long: -124.022949

OHWM #1
0.33 AC.
607 LINEAR FT.

MITIGATION AREA

DI

WETLAND #1
1.40 AC.

STORMWATER RETENTION BASINS (CONSTRUCTED)

STORMWATER OVERFLOW CONVEYANCE FEATURE

IMPACT AREA D
<P> 0.27 AC.

IMPACT AREA A
<E> 0.73 AC.

WETLAND #2
1.17 AC.

WETLAND #3
0.29 AC.

IMPACT AREA C
<P> 0.47 AC.

STORMWATER RETENTION BASIN (CONSTRUCTED)

IMPACT AREA B
<E> 0.10 AC.

Lat: 40.901205
Long: -124.016283

EXPLANATION

- WETLAND BOUNDARY
- WETLAND STUDY AREA
- ORDINARY HIGH WATER MARK
- STORMWATER FEATURES
- OUTER PROPERTY BOUNDARY
- IMPACT AREAS

N

0 200

PHOTO SOURCE:
GOOGLE EARTH, 2019

1 " = 200 '±

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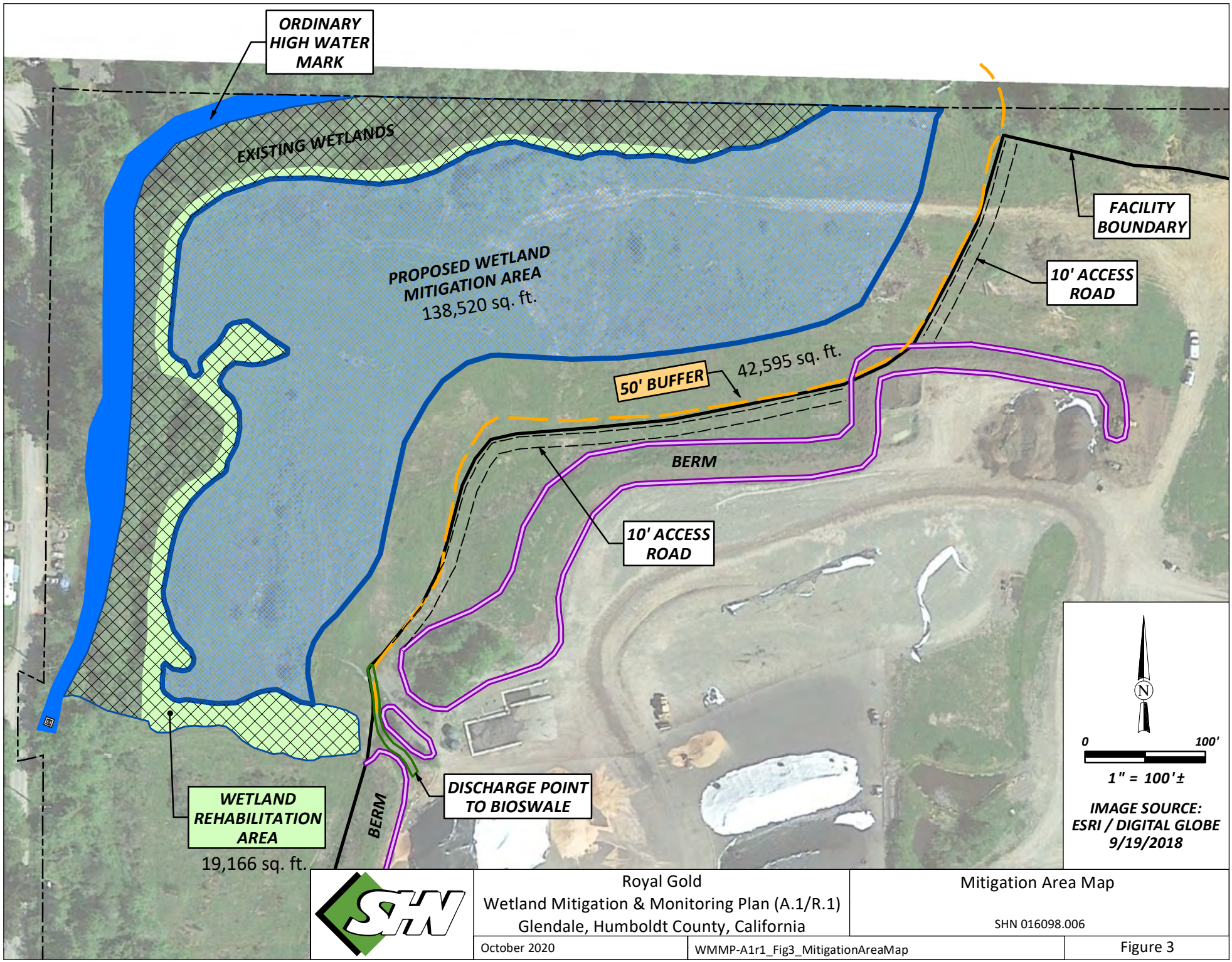
SHN	Royal Gold Wetland Mitigation & Monitoring Plan (A.1/R.1) Glendale, Humboldt County, California	Impacted Areas SHN 016098.006
	October 2020 | WMMP-A1r1_Fig2_ImpactedAreas	Figure 2



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SHN	Royal Gold Wetland Mitigation & Monitoring Plan (A.1/R.1) Glendale, Humboldt County, California	Mitigation Area Map SHN 016098.006
	October 2020 | WMMP-A1r1_Fig3_MitigationAreaMap	Figure 3

Table 2. Proposed Additional Wetland Mitigation Area Data
Royal Gold Premium Potting Soils, LLC
Glendale, CA

Impact Area	Surface Area (SF)[a]	Mitigation Area Proposed	Location	Coordinates
D	11,761	23,522	Central East	40.902309°, -124.018312°

[a] SF: square feet

Based on review of historical aerial photography, the wetland areas on the central eastern portion of the site were previously graded and used for storage when the site was operated as a mill. Since mill operations ceased at the site, the area has developed wetland characteristics. This area is located at a strategic position to capture and settle stormwater and is proposed to be used as part of the onsite stormwater treatment system to assist in compliance with the California State Water Resources Control Board Industrial General Permit pollutant reduction requirements. This Addendum proposes to maximize use of the wetland areas on the central eastern portion of the site for stormwater management by incorporating an additional 11,761 SF of wetland area into the stormwater system.

Royal Gold is proposing to mitigate wetland impacts at a 2:1 replacement ratio as described in the WMMP (see Appendix 2). Wetlands impacted by the prior activities (Impact Areas A and B) are estimated to total 36,140 SF. With the addition of Impact Area D (11,761 SF), wetlands proposed to be impacted at the site are estimated to total 33,120 SF. For all existing and proposed wetland impacts, a 2:1 replacement ratio would result in 138,520 SF of created wetlands (see Table 3 and Figure 3). Wetland mitigation areas will be contoured and planted with native wetland vegetation to create wetlands of equal or greater value than those being lost because of the project. All wetland mitigation will occur within upland areas. Mitigation wetlands will be of the same type as those impacted (see Appendix 2).

Table 3. Amended Total Wetland Mitigation Area Data
Royal Gold Premium Potting Soils, LLC
Glendale, CA

Impact Area	Surface Area (SF)[a]	Mitigation Area Proposed	Location	Coordinates
A	31,802	63,604	Central	40.901949°, -124.019869°
B	4,338	8,676	Central	40.901671°, -124.020537°
C	21,359	42,718	Central East	40.902401°, -124.018230°
D	11,761	23,522	Central East	40.902861°, -124.018024°
Total	**69,260**	**138,520**	-	

[a] SF: square feet

3.0 Wetland Mitigation and Improvement

As described above, approximately 69,260 SF of wetland habitat has been impacted or will be impacted by improvements at the Royal Gold facility (see Figure 2). The impacted wetland areas are characterized as freshwater emergent wetland, as well as freshwater forested/shrub wetland from prior observations

by SHN staff (SHN, 2018) and historical aerial imagery (Google Earth, 2019). Dominant tree species throughout the wetland areas consisted primarily of arroyo willow (*Salix lasiolepis*). The shrub layer is composed of Himalayan blackberry (*Rubus armeniacus*). Dominant herbaceous species included bur clover (*Medicago polymorpha*), common rush (*Juncus effusus* ssp. *pacificus*), and toad rush (*Juncus bufonius)* (Sawyer et al., 2009; Calflora, 2018; Baldwin et al., 2012). The wetland area topography is gently rolling with two to five percent slopes.

Many non-native species were observed within the wetland areas, with varying degrees of dominance. Vegetation included: creeping buttercup (*Ranunculus repens*), tall fescue (*Festuca arundinacea*), pennyroyal (*Mentha pulegium*), velvet grass (*Holcus lanatus*), Himalayan blackberry, and creeping bentgrass (*Agrostis stolonifera*) (California Invasive Plant Council, 2018)."

3.1 Wetland Creation and Improvement Plan

As described in greater detail below and in the WMMP, vegetation will be planted in four distinct zones (see Tables 4 and 5). To mitigate for the additional wetland impacts proposed in this Addendum, the additional mitigation area associated with Impact Area D (23,522 SF) will represent a mixture of 50 percent Freshwater Emergent (0.27 acres or 11,761 SF) and 50 percent Freshwater Forested Shrub (0.27 acres or 11,761 SF) type mitigation zones. The WMMP currently proposes 37,949 SF of Freshwater Emergent wetland habitat. With the addition of the mitigation area required for Impact Area D, the total Freshwater Emergent wetland habitat would be increased to 49,710 SF. The WMMP currently proposes 77,049 SF of Freshwater Forested Shrub wetland habitat. With the addition of the mitigation area required for Impact Area D, the total Freshwater Forested Shrub wetland habitat would be increased to 88,810 SF. The new surface area and number of plants can be found in Table 4. The amended planting list is included as Appendix 1 to this Addendum. The Freshwater Emergent Rehabilitation plant numbers have not changed with this Addendum. Please refer to the planting list in the original WMMP for the Freshwater Emergent Rehabilitation zone.

Table 4. Amended Wetland Mitigation Planting Zone Data
Royal Gold Premium Potting Soils, LLC
Glendale, CA

Mitigation Zone	Surface Area (SF)[a]	Elevation	Trees	Shrubs	Herbs	Total Plants
Freshwater Emergent	49,710	Low	62	561	2,246	2,869
Freshwater Forested Shrub	88,810	Mid	112	1,579	4,045	5,736
Total	**138,520**	-	**174**	**2,140**	**6,291**	**8,605**

[a] SF: square feet

3.2 Freshwater Emergent (Low-Elevation) Wetland Mitigation Area

The lowest elevation will encompass approximately 49,710 SF and will have standing water for the longest period. Species to be planted in this location include obligate (OBL) and facultative wet (FACW) wetland plant species. The elevation range within this area is designated as 116 to 116.8 feet.

Species recommended for planting within the lowest elevation include:

1. Trees: Pacific willow (*Salix lasiandra* var. *lasiandra*), arroyo willow
2. Shrubs: Douglas spirea (*Spirea douglasii*), salmon berry (*Rubus spectabilis*), red twig dogwood (*Cornus sericea*), and ninebark (*Physocarpus capitatus*)
3. Herbs: common rush, spreading rush *(Juncus patens*), common spikerush (*Eleocharis palustris*), panicled bulrush (*Scirpus microcarpus*), tall flatsedge (*Cyperus eragrostis*), brownhead rush (*Juncus phaeocephalus*), marsh cinquefoil (*Comarum palustre*), water parsley (*Oenanthe sarmentosa*), and arctic sweet coltsfoot (*Petasites frigidus* var. *palmatus*)

Freshwater emergent wetland plants should be installed at sufficient densities to facilitate the creation of wetland habitat, and to ensure that vegetation coverage nears 100 percent to prevent the encroachment of invasive species. The amended planting list is included as Appendix 1 to this Addendum.

1. Trees should be planted at 30-foot centers, with 14 additional plants, for a total of **62** trees
2. Shrubs should be planted at 10-foot centers, with 125 additional plants, for a total of **561** shrubs
3. Herbs should be planted at 5-foot centers, with 501 additional plants, for a total of **2,246** herbs
4. Total plants installed in low-elevation wetland, with 640 additional plants: **2,869**

Plant species will be randomly installed within the freshwater emergent wetland area and are to mimic natural wetland conditions, although care should be taken to maximize vegetation cover, and prevent overcrowding of planted wetland vegetation.

3.3 Freshwater Forested/Shrub (Mid-Elevation) Wetland Mitigation Area

The mid-elevation zone will be the largest wetland area encompassing approximately 88,810 SF and will be graded with a 2-5 percent slope that will drain more quickly. Vegetation installed within this location will include FACW and facultative (FAC) wetland plant species. The elevation range within this area is designated as 116.8 to 117.5 feet. Species recommended for planting within the mid-elevation wetland mitigation area include:

1. Trees: red alder (*Alnus rubra*), cascara (*Frangula purshiana* ssp. *purshiana*), Oregon ash (*Fraxinus latifolia*), western red cedar (*Thuja plicata*), Sitka spruce (*Picea sitchensis*), Pacific willow, arroyo willow, and Pacific bay (*Umbellularia californica*)
2. Shrubs: California blackberry (*Rubus ursinus*), thimbleberry (*Rubus parviflorus*), red elderberry (*Sambucus racemosa*), mock orange (*Philadelphus lewisii*), twinberry (*Lonicera involucrata* var. *involucrata*), oso berry (*Oemleria cerasiformis*), red twig dogwood, ninebark, and salmon berry

3. Herbs: arctic sweet coltsfoot, blue eyed grass (*Sisyrinchium bellum*), tall flatsedge, common rush, spreading rush, western rush (*Juncus occidentalis*), and lady fern (*Athyrium filix-femina* var. *cyclosorum*)

Freshwater Forested/Shrub wetland plants should be installed at sufficient densities to facilitate the creation of wetland habitat, and to ensure that vegetation coverage nears 100 percent to prevent the encroachment of invasive species. The amended planting list is included as Appendix 1 to this Addendum.

1. Trees should be planted at 30-foot centers, with 14 additional plants, for a total of **112** trees
2. Shrubs should be planted at 8-foot centers, with 195 additional plants, for a total of **1,579** shrubs
3. Herbs should be planted at 5-foot centers, with 501 additional plants, for a total of **4,045** herbs
4. Total plants installed within sloping wetland, with 710 additional plants: **5,736**

Conifer species should be planted along the southern edge of wetland areas at an elevation of 117 to 117.5 feet with willow stakes immediately to the north of the conifer plantings to discourage non-native establishment through shading of the wetland.

Plant species should be randomly planted within the mid-elevation area to mimic natural wetland conditions, although care should be taken to maximize vegetation cover and prevent overcrowding of planted wetland vegetation. Willow staking will be used for the planting of any willows at this location.

3.4 Upland Buffer Area

This area will be designed primarily for habitat screening to protect the created wetland habitat from disturbance. The upland buffer area encompasses approximately 42,595 SF and will not count toward wetland creation. Species appropriate for this location include evergreen upland species planted with appropriate spacing for screening. The buffer area will include 21,297 SF of tree and shrub plantings. The entire upland buffer area will also be planted with herbaceous species through broadcast seeding. With the expansion of the wetland mitigation area, the upland buffer will also be expanded. The new surface area and number of plants for the upland buffer area can be found in Table 5.

Table 5. Amended Wetland Mitigation Upland Planting Zone Data
Royal Gold Premium Potting Soils, LLC
Glendale, CA

Zone	Surface Area (SF)[a]	Elevation	Trees	Shrubs	Herbs	Total Plants
Upland Buffer[b]	42,595	High	60	243	-	303

[a] SF: square feet

[b] Only 50% of area is being planted for a total of 21,297 SF.

Species recommended for planting within the upland buffer area include:

1. Trees: coast redwood (*Sequoia sempervirens*), California Bay (Umbellularia *californica*), Douglas fir (*Pseudotsuga menziesii*), and Sitka spruce.
2. Shrubs: Saskatoon serviceberry (*Amelanchier alnifolia*), coyote brush (*Baccharis pilularis* ssp. *consanguinea*), western hazelnut (*Corylus cornuta*), salal (*Gaultheria shallon*), oceanspray (*Holodiscus discolor*), California wax-myrtle (*Morella californica*), oso berry, and evergreen huckleberry (*Vaccinium ovatum*).
3. Herbs: yarrow (*Achillea millefolium*), California brome (*Bromus carinatus* var. *carinatus*), red fescue (*Festuca rubra*), and tufted hair grass (*Deschampsia cespitosa ssp. cespitosa*)

Upland buffer plants should be installed at sufficient densities to create screening for the proposed wetland habitat and to ensure that vegetation coverage nears 100 percent to prevent the encroachment of invasive species.

1. Trees should be planted at 20-foot centers for a total of **60** trees
2. Shrubs should be planted at 10-foot centers for a total of **243** shrubs
3. Herbs should be seeded at a rate of **50** pounds/acre
4. Total plants planted within upland buffer: **303**

See Appendix 3, Table 1 in the 2019 WMMP (Appendix 2), for spacing within the upland buffer.

4.0 Monitoring and Reporting Program–Performance Standards

Success of the mitigation program is defined as creating in-kind wetland habitat, as well as wetland habitat improvement, to mitigate for a loss of wetlands resulting from the past and proposed development at the Royal Gold facility. A total of 138,520 SF of in-kind wetland habitat will be created and planted with native wetland vegetation species and approximately 19,166 SF of existing, lower quality wetland habitat will be rehabilitated. An additional 21,297 SF of upland buffer habitat will be planted predominantly with trees and shrubs to screen the wetland mitigation area from disturbance.

The success of the wetland mitigation planting areas may be achieved with a combination of success criteria that includes:

- a minimum of 138,520 SF of wetlands are created;
- 75 percent survival of planted trees, shrubs, and herbaceous plants (including wild recruitment of native species) within the created wetlands;
- 75 percent survival of planted trees, shrubs, and herbaceous plants (including wild recruitment of native species) within the upland buffer;
- live vegetation throughout all revegetated areas (some minor gaps are expected);
- invasive species are removed and reduced within existing wetland rehabilitation areas and are discouraged from becoming established within the new wetland and planting areas;

- revegetation plants are not substantially suppressed from herbivory, competition from weeds, or encroachment by humans; and
- supplemental irrigation, or replacement plantings have not been needed in the preceding growing season to meet the 75 percent survival threshold.

5.0 References Cited

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---. (2019). *Wetland Mitigation and Monitoring Plan, Royal Gold LLC*. Eureka, CA:SHN.

Amended Planting List 1

Amended Planting List Royal Gold Wetland Mitigation					
Latin Name	**Common Name**	**# of Plants[a]**	**Minimum Spacing[a] (feet)**	**Plant Size**	**Placement**
Low-Elevation Wetland Planting Area (49,710 SF)					
Trees					
Salix lasiandra var. *lasiandra*	pacific willow	25	30	live stake	random
Salix lasiolepis	arroyo willow	37	30	live stake	random
Shrub					
Spirea douglasii	Douglas spirea	140	10	4 in.[b]/1 gallon	random
Physocarpus capitatus	ninebark	140	10	4 in./1gallon	random
Cornus sericea	red twig dogwood	140	10	1 gallon	random
Rubus spectabilis	salmon berry	141	10	1 gallon	cluster
Herbs					
Juncus effusus ssp. *pacificus*	common rush	363	5	plug	random
Juncus patens	spreading rush	396	5	plug	random
Scirpus microcarpus	panicled bulrush	410	5	plug	cluster
Cyperus eragrostis	tall flatsedge	315	5	plug	cluster
Eleocharis palustris	common spikerush	123	1	any	cluster
Juncus phaeocephalus	brownhead rush	255	5	plug	cluster
Comarum palustre	marsh cinquefoil	74	5	any	cluster
Oenanthe sarmentosa	water parsley	155	5	any	cluster
Petasites frigidus var. palmatus	arctic sweet coltsfoot	155	5	4 in.	cluster
Total Number of Plants Low-Elevation Area		**2,869**			
Mid-Elevation Wetland Planting Area (88,810 SF)					
Trees					
Alnus rubra	red alder	17	30	1 gallon	random and cluster
Frangula purshiana ssp. *purshiana*	cascara	12	30	1 gallon	cluster
Fraxinus latifolia	Oregon ash	15	30	1 gallon	random and cluster
Thuja plicata	western red cedar	15	30	1 gallon	random and cluster
Umbellularia californica	California bay	14	30		random and cluster
Picea sitchensis	Sitka spruce	15	30	1 gallon	random and cluster
Salix lasiandra var. *lasiandra*	pacific willow	12	30	live stake	random
Salix lasiolepis	arroyo willow	12	30	live stake	cluster
Shrubs					
Lonicera involucrata var. *ledebourii*	twinberry	386	10	1 gallon	random and cluster
Rubus ursinus	CA blackberry	167	10	4 in. or 1 gallon	random
Rubus spectabilis	salmonberry	251	10	1 gallon	random
Rubus parviflorus	thimbleberry	217	10	1 gallon	random

Amended Planting List Royal Gold Wetland Mitigation					
Latin Name	**Common Name**	**# of Plants[a]**	**Minimum Spacing[a] (feet)**	**Plant Size**	**Placement**
Philadelphus lewisii	mock orange	81	10	1 gallon	random
Cornus sericea	red twig dogwood	66	10	1 gallon	random
Physocarpus capitatus	Pacific ninebark	69	10	1 gallon	random
Oemleria cerasiformis	oso berry	171	10	1 gallon	random
Sambucus racemosa	red elderberry	171	10	1 gallon	cluster
Herbs					
Sisyrinchium bellum	blue-eyed grass	386	5	4 in.	cluster
Petasites frigidus var. palmatus	arctic sweet coltsfoot	235	5	4 in.	cluster
Juncus effuses ssp. *pacificus*	common rush	1,191	5	plug	random
Juncus patens	spreading rush	1,191	5	plug	cluster
Juncus occidentalis	western rush	374	5	plug	cluster
Cyperus eragrostis	tall flatsedge	451	5	plug	cluster
Athyrium filix-femina var. *cyclosorum*	lady fern	217	5	1 gallon	random
Total Number of Plants Mid-elevation Area		**5,736**			
Total Wetland Mitigation Plants		**8,605**			

[a] Spacing on center. Size substitutions acceptable, at appropriate compensation ratio, if specified size not available. Example: 4 in. can be similar size such as deep pot, tree tube, quart, etc. Per contractor discretion.

[b] in.: inch

Summary of the County of Humboldt's Streamside Management Areas and Wetlands

1

Summary of the SMAWO Ordinance

Riparian habitats receive protection under Humboldt County's Streamside Management Areas and Wetlands Ordinance (SMAWO); as defined in Title 3, Division 1, Section 314-61.1 of the Humboldt County Code (County of Humboldt, 2019). The purpose of the SMAWO is to provide oversight in the use and development of land located within wet areas such as rivers, creeks, springs, and other wetland types. This includes natural resource areas along both sides of streams containing the channel and adjacent land.

Development and work within streamside management areas (SMAs) or wetlands requires a special permit from the County if those activities are not exempt. Both intermittent streams and seasonal wetlands are defined as extending 50 feet from either side of the stream transition line (measured as the horizontal distance from the top of bank or edge of riparian drip-line whichever is greater) or the edge of the delineated wetland.

Routine maintenance activities are permitted under the SMAWO if trees over 12 inches in diameter are not cut and no more than 6,000 cumulative square feet of woody vegetation are removed. Additionally, activities are not considered routine maintenance if they could result in significant environmental impacts. Significance of environment impacts can be a difficult to qualify on a case-by-case level. However, the California Department of Fish and Wildlife generally considers the removal of woody vegetation greater than 4 inches in diameter as an activity that requires compensatory mitigation. Mitigation measures for projects within SMAs include retaining snags and trees that support nesting birds, replanting of disturbed areas equal to the development area, and other potential site-specific habitat improvement.

Wetland Mitigation Plan
Baseline Assessment

2

Wetland Mitigation Plan
Baseline Assessment

Royal Gold Premium Potting Soils, LLC
Assessor's Parcel Numbers:
516-101-040
516-101-064
516-101-068
516-101-084
Glendale, California


Prepared for:
Royal Gold Premium Potting Soils, LLC

October 2019
016098.006

Reference: 016098.006

Wetland Mitigation Plan
Baseline Assessment

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Assessor's Parcel Numbers:
516-101-040
516-101-064
516-101-068
516-101-084
Glendale, California

Prepared for:
Royal Gold Premium Potting Soils, LLC

Prepared by:

1062 G Street, Ste. I
Arcata, CA 95521-5800
707-822-5785

October 2019

QA/QC: GCR

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Abbreviations and Acronyms

F	Fahrenheit
g/cm^3	grams per cubic centimeter
µS/cm	micro Siemens per centimeter
NTU	nephelometric turbidity units
ppm	parts per million
SF	square feet
aquis	wet
Ca	calcium
Cal Fire	California Department of Forestry and Fire Protection
CDO	Climate Data Online
CL	clay loam
Cu	copper
ETo	Evapo Transpiration Zone
Fe	iron
FRAP	Fire Resource and Assessment Program
Hum	humus
K	potassium
L	loam
LRR	Land Resource Region
MBA	Wetland Mitigation Plan Baseline Assessment
MCL	mucky clay loam
Mg	magnesium
MLRA	Major Land Resource Area
Mn	manganese
MP	Mitigation Pit
N	nitrogen
NOAA	National Oceanic Atmospheric Administration
NRCS	Natural Resources Conservation Service
NTU	nephelometric turbidity unit
P	phosphorus
Royal Gold	Royal Gold Premium Potting Soils, LLC
SCL	sandy clay loam
SL	sandy loam
TDS	total dissolved solids
USACE	United States Army Corp of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WFO	weather forecast office
WRCC	Western Region Climate Center
WS	Water Sample
Zn	zinc

1.0 Background

This Wetland Mitigation Plan Baseline Assessment (MBA) was prepared by SHN on behalf of Royal Gold Premium Potting Soils, LLC (Royal Gold) to help guide wetland mitigation project design. The goals of this MBA are to:

1) guide in-kind wetland mitigation design by providing reference data from existing wetland features surrounding, and adjacent to, the proposed mitigation area; and
2) guide in-kind wetland mitigation design by providing in-situ soil and environmental data within the proposed wetland mitigation area (existing upland) to compare with adjacent wetland conditions. This comparison will be used to help select management and installation practices such as soil amendment additions, physical site preparation, plant species to install, etc.; and
3) provide reference data to guide the post-construction monitoring program, and to help determine when performance standards have been met for project completion (i.e. at the end of the 3-5 year monitoring period).

1.1 Baseline Assessment Purpose

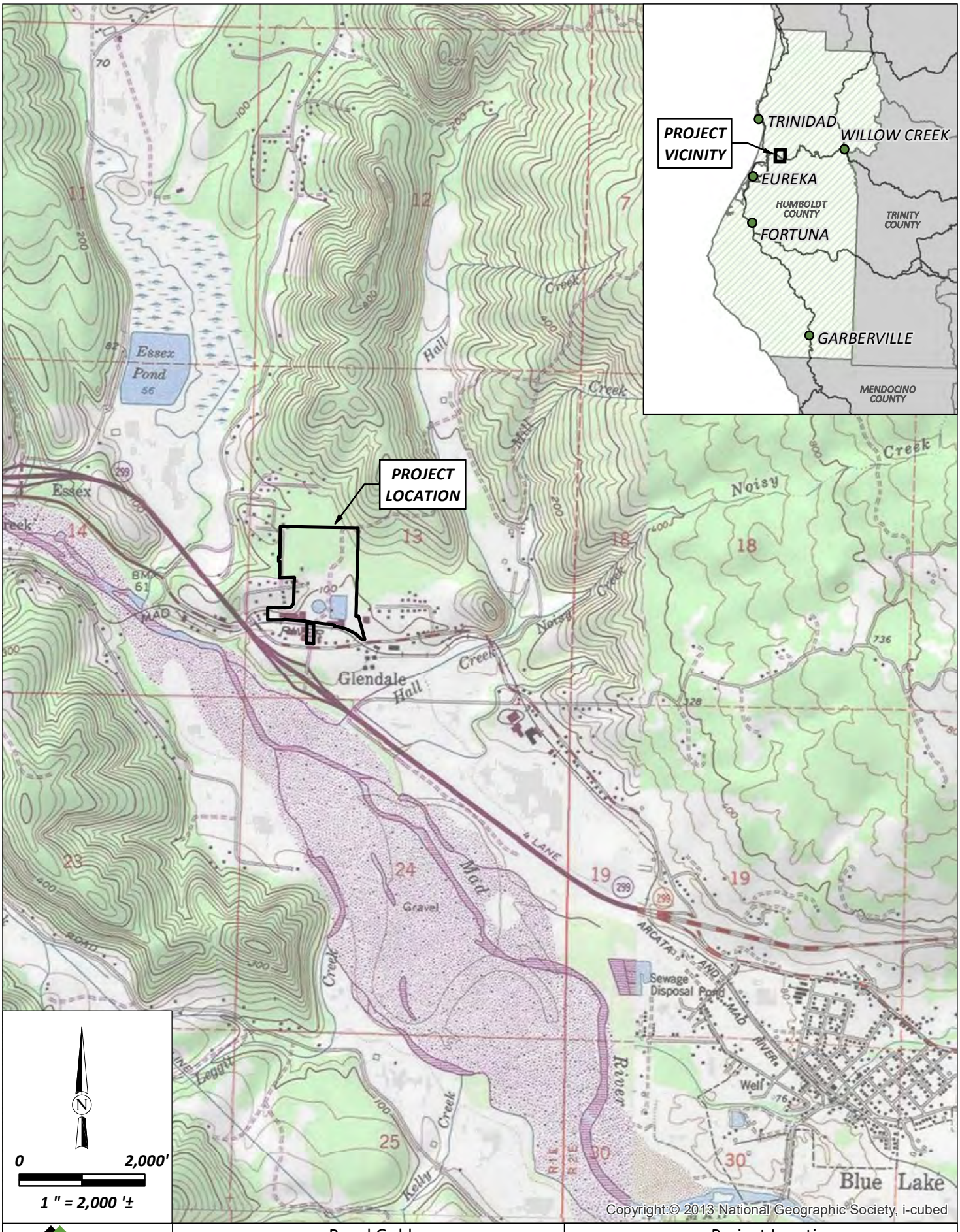
Inadequate physical, chemical, and hydrological soil properties of created mitigation wetlands are the primary cause of relative failure in meeting mitigation goals (Daniels & Whittecar, 2004). Designers often fail to recreate target wetland conditions due to poor or lacking site assessments regarding soils, hydrology, and other environmental factors. Initial site conditions and soil amending practices play a critical role in successful soil and plant community development (Ballantine, et. al., 2011). This assessment was performed to increase the potential for meeting wetland mitigation goals within the study area by using a well-informed decision-making framework based on localized environmental conditions. Published background data such as the mapped evapotranspiration and United States Department of Agriculture (USDA) hardiness zones is presented in Sections 1.3 through 1.5. Section 2 outlines the general procedures used in the MBA, while Section 3 presents the onsite baseline data collected during this assessment. Both the background data in Section 1, and the baseline data in Section 3, will be used to assess the project success level and trouble-shoot areas of failure or unsatisfactory results during the adaptive management and project completion phases.

1.2 Study Area Location

The Royal Gold facility is located in Glendale, California, an unincorporated community within Humboldt County (Figure 1; United States Geological Survey [USGS] Arcata North 7.5-minute Quadrangle, Township 6 North, Range 1 east, Section 13, Humboldt Meridian; USGS, 2012). The Royal Gold operation is located on 15 adjacent parcels, with an approximate total area of 43.4 acres. This baseline assessment was performed beginning near the southwestern corner of the proposed mitigation area, and progressed toward the north and east, wrapping around the mitigation area toward the southeast (Figure 2).

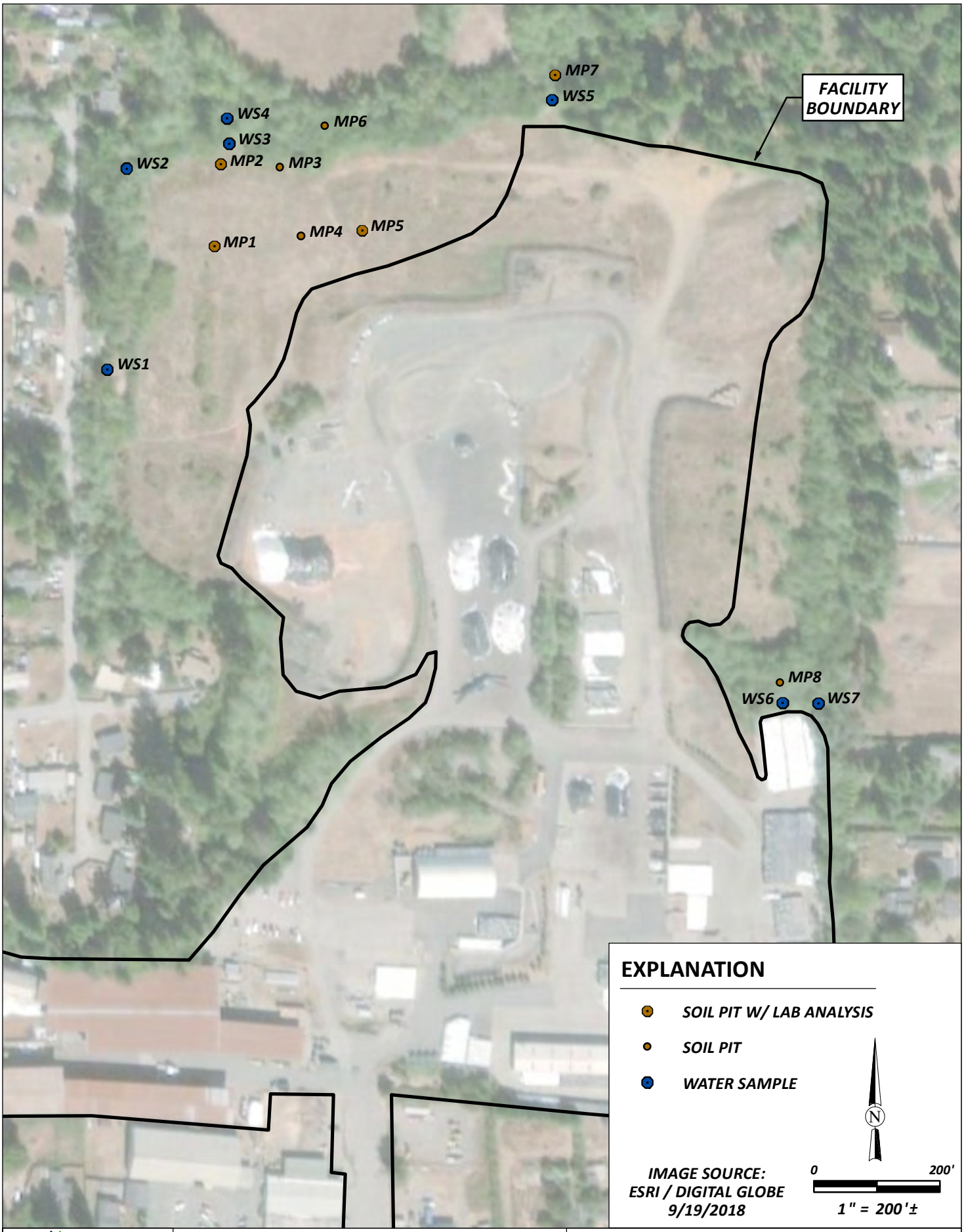
1.3 Study Area Environs and Background Data

The wetland mitigation area lies at the northwestern corner of the site (SHN, 2019). Elevations range from approximately 116 to 120 feet above sea level across the site (Appendix 1; Google, 2019). The Mad River lies 0.42 miles to the southwest, with the Pacific Ocean 6.25 miles to the west. This portion of the site is composed of an open meadow surrounded by riparian habitat to the east, north, and west. The margin of this meadow along the western half of the northern border, wrapping around into the northern portion of the western border, contains an area mapped as freshwater emergent wetland during the most recent



Path: \\Arcata\Projects\2016\016098A-Royal-Gold\GIS\WMIT3_Fig1_ProjectLocation.mxd User Name: jsousa DATE: 10/24/19, 2:53PM

SHN	Royal Gold Wetland Mitigation Plan Baseline Assessment Glendale, Humboldt County, California	Project Location SHN 016098.006
	October 2019 | WMIT3_Fig1_ProjectLocation	Figure 1



Path: \\Arcata\Projects\2016\016098A-Royal-Gold\GIS\WMIT3_Fig2_BaselineAssessment.mxd User Name: jsousa DATE: 10/24/19, 2:55PM

SHN	Royal Gold Wetland Mitigation Plan Baseline Assessment Glendale, Humboldt County, California	Mitigation Baseline Assessment Map SHN 016098.006
October 2019	WMIT3_Fig2_BaselineAssessment	Figure 2

wetland delineation (SHN, 2018). This wetland is bordered to the north and west by an intermittent stream within a freshwater forested/shrub wetland (palustrine scrub-shrub broadleaved deciduous temporary flooded), with the parallel freshwater emergent wetland between the forested wetland to the north and west, and the upland to the south and east. Within this wetland, there are several areas that remain ponded long enough into the spring season to provide habitat for amphibians and aquatic invertebrates. The riparian strip contains an intermittent stream that flows during the winter months and remains ponded through May. This stream is channelized into right angles, indicating historical manipulation during previous land uses. The intermittent stream overflows periodically to flood the study area. Soil characteristics indicate fill placement, with observations of abrupt soil boundaries, large woody debris, and anthropogenic materials, including metal and glass during site assessment. Soils varied across the site, ranging from sandy loam to sandy clay loam. Areas showing previous disturbance from grading or equipment traffic, along with the overflow area around the northwestern wetland, are subject to ponding.

The study area lies within the USDA Natural Resources Conservation Service (NRCS) Land Resource Region (LRR) A, Northwestern Forest, Forage, and Specialty Crop Region (USDA, 2006). Within this LRR, the site lies within Major Land Resource Area (MLRA) 4B, Coastal Redwood Belt. The United States Army Corps of Engineers (USACE) subregion covering the study area is the Western Mountains, Valleys, and Coast Region (USACE, 2010). The Fire Resource and Assessment Program (FRAP) bioregion map places the study area within the Klamath/North Coast bioregion California Department of Forestry and Fire Protection (Cal Fire; Cal Fire, 2002). The USDA plant hardiness zone for the area is listed as 9b, 25 to 30° F (Oregon State University, 2012). Royal Gold lies within Reference Evapo Transpiration Zone (ETo) 1, the Coastal Plains Heavy Fog Belt (UC Davis, 1999). This zone is characterized by dense fog, producing the lowest ETo in California at 33 inches per year. For reference, the statewide average amongst the 18 zones is 51.8 inches, with a range from 39.0 inches in Zone 2 to 71.6 inches in Zone 18.

1.4 Background Climatic Data

Most of the precipitation within the area occurs as low-intensity, Pacific frontal storms (USDA, 2006). Precipitation is generally distributed throughout fall, winter, and spring, with dry summers. Snowfall is rare at this elevation. Coastal fog periodically accumulates within the study area, but less frequently and of shorter duration than immediately along the coast. The FRAP precipitation Map places the study area on the boundary of the 45 and 50 inch per year precipitation zones (Cal Fire, 2000). Regional annual precipitation averages are listed as 40.33 inches in Eureka, 42 to 46 inches in Arcata, and 58.8 inches in Blue Lake, so an estimated annual average of approximately 51 inches per year can be expected at this location. Proximity to the ocean regulates site temperatures, producing a moderate, Mediterranean climate. The mean temperature for nearby Eureka is 52.9° Fahrenheit (F), with an average annual minimum of 46.1° F and maximum of 59.6° F. This data is shown on the Project Site Climatic Assessment data sheet (Appendix 2).

While the National Oceanic and Atmospheric Administration's (NOAA) Eureka Woodley Island weather forecast office (WFO) receives less precipitation than surrounding areas, it is the most consistent source for local weather records. Data from the Eureka WFO can be used to determine if the region has received normal climatic conditions. The highest regional precipitation in recorded history was 67.21 inches in Eureka, while the lowest was 16.60 inches in 2013 (NOAA, 2019). Rainfall totals from the past seven years show the fluctuation the area can receive between years, as outlined in Table 1. With an average annual rainfall of 40.33 inches for Eureka, precipitation data indicates 2013 and 2015 experienced drought conditions, while 2012, 2016, and 2017 received above normal precipitation volumes (Table 1).

Table 1. Average Annual Precipitation for Woodley Island WFO[1] Woodley Island, Eureka, CA[2, 3]

Year	Precipitation (inches)
2018	36.75
2017	49.05
2016	53.13
2015	33.84
2014	37.50
2013	16.60
2012	50.77

1. WFO: Weather forecast office
2. Woodley Island WFO is 9.7 miles southwest of Royal Gold
3. Average Annual Eureka precipitation is 40.33 inches

Precipitation records for the months prior to the baseline assessment indicate a wetter than normal season (Table 2).

Table 2. Monthly Precipitation Data, 2018-2019 Season Royal Gold Premium Potting Soils, LLC Glendale, CA

Month	Eureka WFO[1] (inches)[2]	Eureka WFO (inches)[3]	Arcata CDO[4] (inches)	Arcata Average[5] (inches)	Blue Lake Average (inches)
April 2019	2.51	3.32	3.36	2.50	4.22
March 2019	4.79	5.30	5.27	5.30	8.13
February 2019	14.43	5.63	15.03	6.30	10.73
January 2019	6.67	6.5	7.16	8.60	9.48
December 2018	4.95	8.12	6.83	6.70	8.46
November 2018	4.94	5.61	5.19	4.90	9.09
Total	38.96	34.48	42.84	34.3	50.11

1. WFO: Weather forecast office
2. Observed value
3. Annual average for the month
4. CDO: Climate Data Online station US1CAHM0001(National Oceanic and Atmospheric Association) observed value
5. Weather Atlas accessed at https://www.weather-us.com/en/california-usa/arcata-climate
6. Western Region Climate Center (WRCC) accessed at https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca0903

1.5 Background Soil Data

As discussed in Section 1.3 Study Area Environs and Background Data, soils within the study area are highly disturbed. Along with test pit observations, review of historical aerial imagery shows anthropogenic impact and changes of use over time. Much of the soil within the study area appears to be imported and mixed. The water table observed during this MBA indicates that elevation and topography are the dominant influences on wetland conditions within the study area. Maintaining an elevation between 116 and 117 feet above sea level should connect depressions with the water table and produce hydrophytic vegetation and hydric soils within several years. Soil compaction or textural manipulation will not be required, with the exception of decompacting any soils impacted during grading and construction.

Soil subgroups mapped in the vicinity of the study area are highly variable (Soil Survey Staff, 2019). Soil orders are dominated by ultisols and inceptisols, followed by one area containing an alfisol. Ultisols are characterized by strong soil profile development, illuvial clay horizons and low base saturation, forming in humid climates. Inceptisols are characterized by intermediate soil development, showing distinct soil horizons, but lacking the illuvial clay horizons found in Ultisols. Alfisols typically contain relatively low organic matter but relatively high base saturation. These well-developed soils found in forested environments typically contain illuvial clay horizons (Soil Survey Staff, 2014). A collection of notes on soil orders and great groups found in the area are found in Appendix 3. Of note is the connotative formative element 'hum' within the great group names of many of the surrounding soils. This term is common to freely drained, humus (hum)-rich ultisols in the area. The formative element 'aqu' precedes several of the surrounding Inceptisols, indicating wet (aquic) conditions. Both the wet and high organic conditions indicate suitability for wetland creation.

2.0 Baseline Assessment Procedures

Providing in-kind wetland mitigation has been a challenging endeavor since the Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act). The vast number of variables between sites, the chaotic nature of environmental factors such as climate and hydrology, and the random influences such as pests, diseases, and even unplanned human interactions create an elusive goal in mimicking natural systems. Between 1983 and 2013, the highest and lowest rainfall volumes in recorded history were observed at 67.21 and 16.60 inches, respectively (NOAA, 2019). Such extremes can drown or uproot plants during an above normal season, while a drought season can cause desiccation, stunting, drought-induced disease, or death. During the winter of 1930, February 17 experienced a high temperature of 85° F, when the normal for that day is 56° F (NOAA, 2019). Such shifts can cause premature leaf or flower emergence, followed by a killing freeze.

This MBA has been compiled to help reduce the risk of failure caused by overlooking some of the more commonly excluded assessment characteristics such as soil and hydrological qualities, and to provide data to assist with future monitoring efforts, and to better inform adaptive management. The analysis performed in this MBA includes physical, chemical, hydrological, and biological parameters, as outlined in the Mitigation Project Water Quality Assessment and Mitigation Project Site Assessment field data sheets (Appendix 4a, 4b, 5a, and 5b). Success of the mitigation wetland is defined in the performance standards described in the wetland mitigation plan, as outlined in Section 2.2 Wetland Mitigation Performance Standards.

2.1 Baseline Assessment Methods

The area within, and surrounding, the proposed mitigation site was assessed during the winter of 2018-2019 to determine the quality of the wetlands and habitat, to facilitate design and construction, and to evaluate background conditions for setting success criteria. Environmental characteristics that were assessed included soil physical and chemical properties, basic water chemistry, plant species and health, wetland conditions, landform setting, and general landscaping concerns for plant establishment. The latter portion of the assessment occurred as the seasonal wetland areas were drying up so that amphibian and aquatic invertebrate populations could be assessed.

Nine soil pits, designated 'mitigation pits' (MPs), were excavated across the site to assess soil physical, chemical, hydrological, and biological properties. Soil samples were extracted from four of these MPs and submitted for chemical and physical laboratory analysis. Water quality was analyzed at seven water sample (WS) locations, four of which corresponded with MP locations. The assessment locations were chosen to characterize the various types of soils and water features across the site. Locations were chosen to

represent both in-situ upland soil characteristics, as well as reference wetlands adjacent to the proposed mitigation wetland site. These locations are shown on the MBA map in Figure 2 to illustrate the spatial distribution of the MBA in relation to the proposed wetland mitigation area, and to show the locations where data was recorded on the field data sheets (Appendix 4a, 4b, 5a, and 5b).

2.2 Wetland Mitigation Performance Standards

Success of the mitigation plan is defined as creating in-kind wetland habitat to mitigate for a loss of wetlands resulting from past and proposed improvements at the Royal Gold site (SHN, 2019). A total of 114,998 square feet of in-kind wetland habitat will be created and planted with native wetland vegetation species. Success of the plan is also defined as rehabilitating 19,166 square feet (SF) of existing, lower quality wetlands adjacent to the mitigation wetland and planting 18,888 SF of the upland buffer for the mitigation wetland with trees and shrubs. The success of the wetland mitigation planting areas may be achieved with a combination of success criteria that includes:

- A minimum of 114,998 SF of wetlands are created;
- 75 percent survival of planted trees, shrubs, and herbaceous plants (including wild recruitment of native species) within the created wetlands;
- 75 percent survival of planted trees, shrubs, and herbaceous plants (including wild recruitment of native species) within the upland buffer;
- live vegetation throughout all revegetated area (some minor gaps are expected);
- invasive species are removed and reduced within existing wetland rehabilitation areas and are discouraged from becoming established within the new wetland and upland planting areas;
- revegetation plants are not substantially suppressed from herbivory, competition from weeds, or encroachment by humans; and
- supplemental irrigation or replacement plantings have not been needed in the preceding growing season to meet the 75 percent survival threshold.

These performance standards are proposed to be met by using the information within this report to mimic surrounding wetland conditions.

3.0 Baseline Assessment

3.1 Environmental Variation

Setting baseline conditions for environmental management is challenging due to annual variability. Wildlife populations are a prime example of such change. In the 1980s, there was no local goose population. In 2001, the Aleutian Cackling Goose (*Branta hutchinsii*) was delisted under the Endangered Species Act. This species, along with its larger counterpart, the Canada Goose (*Branta Canadensis*), now frequent the area in large numbers. Bald eagles (*Haliaeetus leucocephalus*) and peregrine falcons (*Falco peregrinus*) have also been frequently observed, where they were a rarity in the 1980s. The Roosevelt Elk (*Cervus canadensis roosevelti*) is another species formerly seen only in a small herd in Prairie Creek Redwood State Park. Now a herd of this species frequents the study area.

Another change in recent years has been the drawdown of most local streams and rivers due to the cannabis industry (Bauer, 2015). A third category of change has been climatic variability. During the droughts of the 1980s, local duck populations were scarce and wetlands were dry. The area's 2013

historically low rainfall left wetlands, sloughs, and streams very low or dry. Flood events such as the December 1996 Eureka area monthly record, and the September 19, 2019 storm in Arcata demonstrate the extreme weather events that can permanently change the landscape.

Pest and disease epidemics such as the spotted wing Drosophila, sudden oak death, and pine pitch canker are examples of relatively new outbreaks in California. These outbreaks are examples of epidemics that affect multiple species across a broad landscape range. Installing a diverse plant palette can help mitigate such potential future outbreaks.

These events illustrate the need to incorporate an adaptive management strategy into monitoring and operations in order to accommodate environmental variations and fluctuating climate trends to encourage the trajectory to ensure meeting the success criteria for mitigation wetland development.

3.2 Water Quality Baseline

Water quality data is presented in the Mitigation Project Water Quality Assessment data sheets and laboratory results found in Appendix 4. Figure 2 shows the locations of sample points WS1 through WS7. Average wetland pool depth was eight inches within the study area. Dissolved oxygen was low across the site, ranging from 1.5 to 6.8 milligrams per liter, with an average of 3.47 across the seven WSs that remained ponded into May. pH ranged from 5.5 to 7.1, with a true average of 6.03 in the samples below 7 (two samples had a pH of 7.1). Electrical conductivity ranged from 57 to 335 micro Siemens per centimeter (μS/cm), with an average of 214 across the site. As a side note, total dissolved solids (TDS) is approximately one-half of the conductivity value, but reported in parts per million (ppm). Turbidity ranged from 15.5 to 61.0 nephelometric turbidity units (NTUs) across the site, with an average of 29.3. Juvenile frogs and aquatic invertebrates were numerous and diverse in all WS locations except WS5, which was a narrow channel with enough flow velocity to keep the area flushed of organisms.

Table 3. Baseline Water Quality Data
Royal Gold Premium Potting Soils, LLC
Glendale, CA

Location	pH	Conductivity (μS/cm)[1]	Turbidity (NTU)[2]	Water Depth (inches)	Dissolved Oxygen (milligram/liter)	Understory /Canopy Vegetative Cover
WS1	6.4	141	34.5	7	3.6	50%/37%
WS2	6.5	202	32.2	6	1.7	96%/90%
WS3	7.1	356	17.4	3-6	6.8	50%/50%
WS4	6.2	114	19.8	11	1.9	50%/60%
WS5	5.5	57	15.5	3	3.6	94%/92%
WS6	7.1	295	61	19	5.2	25%/90%
WS7	6.8	335	24.6	6	1.5	0%/94%
Average	6.0[3]	214	29.3	8	3.47	52%/73%

1. μS/cm: micro Siemens per centimeter
2. NTU: nephelometric turbidity units
3. Average is the true average rather than the arithmetic average.

3.3 Soils Baseline

Soils varied greatly across the site, but were very deep throughout. Appendix 5a contains the Mitigation Project Site Assessment data sheets for sample locations MP1 through MP8, followed by the laboratory reports for MPs 1, 2, 5, and 7 (see Table 3; Appendix 5b). The vicinity around MP1, in the west central

portion of the mitigation area, appears to be covered with log deck soil composed of river rock and large amounts of bark, woody debris, and humus. Soils adjacent to the stream are generally clay loam with dark colors indicative of large organic matter volumes. Organic matter was high on most soils with an average of 10%. The exception to this was at MP5, where only two percent organic matter was found. MP5 was characterized by yellow-orange subsoil that was likely placed as fill to level the area for historical industrial use. Surface soil ranging from MP5 (toward the eastern edge of the proposed mitigation area) to the east contains this yellow orange clay loam material. pH averaged 5.27 and ranged from 5.0 to 5.8. Bulk density averaged 0.93 grams per cubic centimeter (g/cm^3) and ranged from 0.83 to 1.12. Macronutrients and zinc were low, while manganese, copper, and boron were generally adequate. Iron was generally tenfold higher than required for plant growth. Soils across the site were generally loam or sandy loam over clay loam. Additionally, many of the wetland areas within forest canopy contained two to three inches of peat and a dense, fine root mat over the surface. These nutrient-poor clay loam soils, with generally high organic matter concentrations, appear to be ideal for wetland creation.

Table 4. Baseline Soil Data
Royal Gold Premium Potting Soils, LLC
Glendale, CA

Location	pH	Conductivity (μS/cm)[1]	Organic Matter	Bulk Density[2]	Deficient Nutrients[3]	Excess Nutrients	Texture[4, 5]
MP1	5.8	270	9%	0.83	N, P, K,Ca, Mg, Zn	Fe	SL/CL
MP2	5.7	300	11%	0.91	N, P, K,Ca, Mg, Zn	Fe, Mn	SCL/MCL
MP5	5.1	100	2%	1.12	N, P, K,Ca, Mg, Zn, Mn, Cu, Fe	Ø	CL/SCL
MP7	5.0	170	10%	0.87	N, P, K,Ca, Mg, Zn, Cu	Fe	SL/L
Average	5.27[6]	210	8%	0.93			

1. µS/cm: micro Siemens per centimeter
2. Units are grams per cubic centimeter (g/cm^3)
3. N = nitrogen, P = phosphorus, K = potassium, Ca = calcium, Mg = magnesium, Zn = zinc, Mn = manganese, Cu = copper, Fe = iron
4. Surface horizon texture/subsoil texture
5. SL= sandy loam, CL = clay loam, SCL = sandy clay loam, MCL = mucky clay loam, L = loam
6. Average is the true average, as opposed to the arithmetic average

3.4 Hydrology Baseline

Hydrology across the site is driven by elevation and soil texture. Soils at approximately 116 feet above sea level are primarily clay loam or muck soils with moderately low to low saturated hydraulic conductivity and moderately well-drained to somewhat poorly-drained soils. These characteristics allow the water table to rise vertically through the soil column during the rainy season, while maintaining low infiltration of precipitation or flood water. As elevation rises to the south, the elevation increase results from well-drained to moderately well-drained loam or sandy loam fill soils that appear to be historically-placed log deck materials. These lumber mill soils elevate the soil surface above the seasonal water table and stream overflow, while allowing precipitation to infiltrate and flow laterally over the clay loam subsurface horizon. While MP6, 7, and 8 contained too many coarse roots to excavate beyond 12 inches, these locations held standing or flowing water at least through May 27, indicating poor subsurface drainage due to high clay content and a seasonally high water table (Appendix 4a and 5a).

3.5 Biological Baseline

Juvenile frogs and aquatic invertebrates were numerous and diverse. Aquatic organisms observed included great diving beetles and larvae, whirligig beetles, water boatmen/backswimmers, caddisfly larvae, damsel flies and larvae, water fleas, fairy shrimp, mosquito larvae, water striders, adult and juvenile tree frogs, adult and juvenile red-legged frogs, and juvenile salamanders. Diving beetle larvae, damsel flies, and juvenile frogs dominated the open-meadow pool wetlands.

Various species of damsel flies and dragonflies were observed flying and perching throughout the study area. Canada geese (*Branta canadensis*), wood ducks (*Aix sponsa*), and red winged blackbirds (*Agelaius phoeniceus*) were observed in both the wetlands and upland meadow areas. Coast garter snakes (*Thamnophis elegans terrestris*) were observed in the meadow areas.

Plant species were a diverse mix of native and non-native plants ranging from obligate wetland plants to upland plants throughout the site. Generally riparian trees such as alder and willow, with an understory of sedge were found on the outside of the study area. The inner portion of the study area was dominated by either herbaceous hydrophytes or pasture grasses and herbs, depending on elevation. See the Wetland Delineation (SHN, 2018) and Wetland Mitigation and Monitoring Plan (SHN, 2019) for listings of the plant species found across the site.

3.6 Wetland Habitat Baseline

Wetland habitat varied across the site, even within the intermittent stream channel. Much of the stream channel contains visible microbial iron sheen and orange *Leptothrix* iron bacteria deposits. During the April and May assessment, this water was moving very slowly, yet remained 6 to 12 inches deep. The intermittent stream and associated backwaters are represented by WS1, 2, 4, and 5, along with MP6 and 7. Pool wetlands remaining into the May season included WS3/MP2, WS6/MP8, and WS7/MP9. Short-season pool wetlands comprising the lower pockets within the delineated wetland around the northwestern corner of the Royal Gold site were represented by MP2, MP3, and MP5.

All wetland areas observed during this assessment appear to support amphibians and aquatic invertebrates, while drying up between May and July, which prevents successful bullfrog rearing (Fuller, et. al., 2010). The short-season pools dried up by May during the normal 2018-2019 rainfall season, which allowed the early tree frogs and damsel fly larvae to metamorphose, while the frog and insect eggs deposited later in the season succumbed to dessication. Large mats of decayed juvenile frogs were observed in the lower depressions of these pools. The greatest variable that appeared to dictate length of ponding was elevation, with lower depressions holding water longer into the season. All soil pits contained clay loam within the bottom of the profile, which creates a seasonal partial aquitard by reducing permeability.

All assessed wetlands contained a minimum of 50% native vegetation cover. Within the shaded wetlands, areas subject to ponding contained an average of approximately 30% bare area (open water or bare ground). Tree canopy provided shade over all seven WS locations, as well as over MP6, MP7, MP8, and MP9 (Appendix 4a). The shaded locations exhibited very few invasive, non-native weeds.

4.0 Conclusions

The baseline data collected during this MBA indicates that conditions within the proposed mitigation wetland project area are favorable for creating in-kind wetlands to mitigate for impacts to existing wetlands throughout the site. Background data shows the potential for extreme climatic conditions that could prove deleterious to plant species installed for a mitigation wetland. This potential climatic variability incurs the

necessity to choose hardy and diverse plant species tolerant of fluctuating precipitation volumes and temperature. With the exception of organic matter additions, soil amending will not be required since in-situ soils have similar chemical and physical properties to adjacent wetlands. The primary influence over mitigation wetland installation success will be elevation. Monitoring period success will be dependent on weed control. Environmental conditions observed during this MBA, including water quality, soils, hydrology, biology, and habitat conditions indicate that the site is suitable for mitigation wetland creation.

The data collected and summarized within this assessment will be used to guide the mitigation wetland design. Additionally, both the background and baseline data will be used to assess the project success level and guide the adaptive management strategy to ensure the mitigation wetland project meets the success criteria.

5.0 Limitations

The conclusions in this report represent a "snapshot in time" and it is possible that some species were not present at the time of the fieldwork. As discussed in Section 2 Baseline Assessment Procedures, the random, chaotic, and complex nature of climate and environment make in-kind wetland creation challenging for land managers. This report documents the investigation by using the best professional judgment of SHN's botanist and soil scientist.

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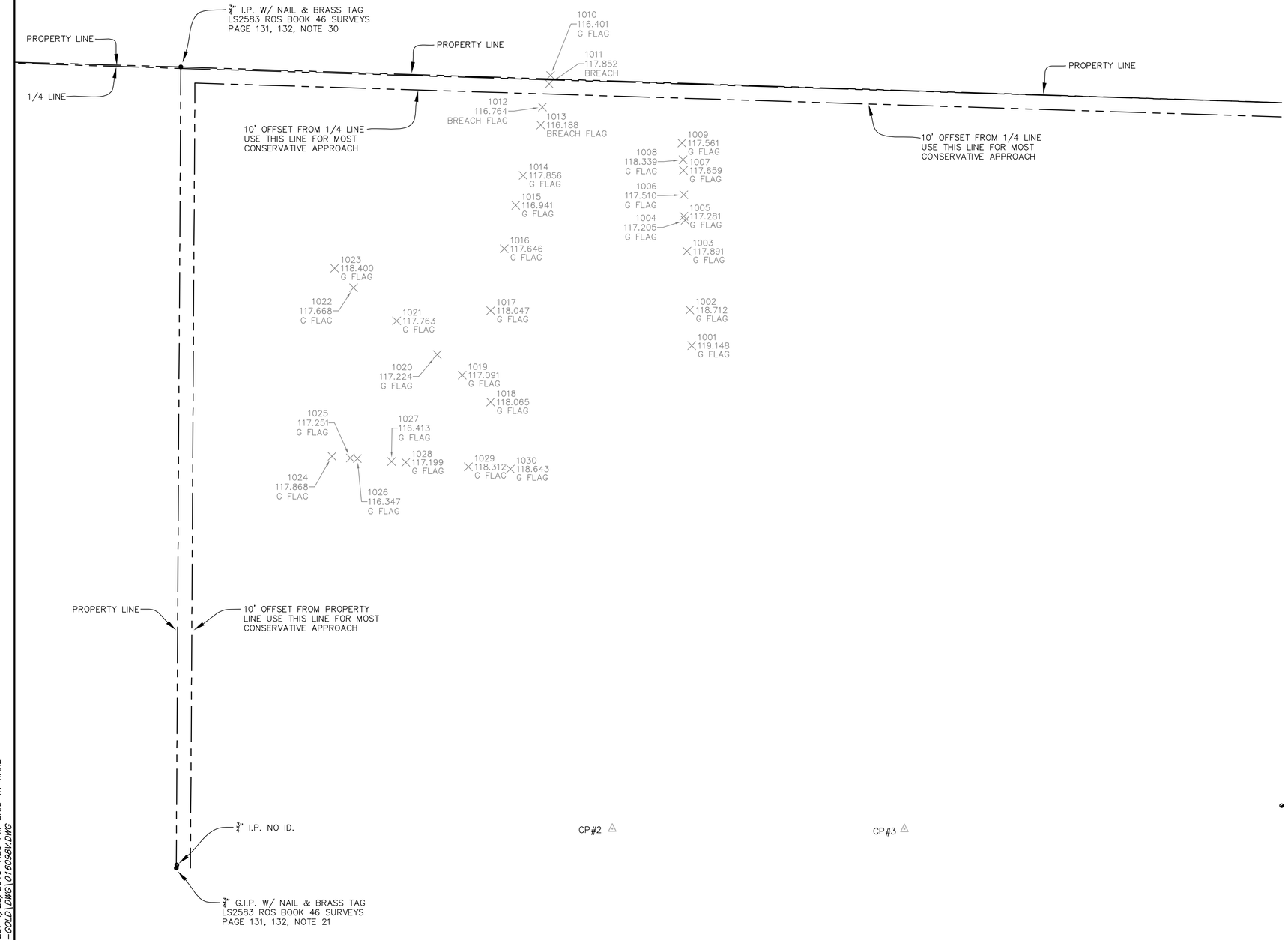
Mitigation Wetland Elevation Profiles

1



NOTES

HORIZONTAL DATUM: CCS83 ZONE 1 BASED UPON GPS OBSERVATIONS, PROCESSED BY NGS OPUS WITH CORS STATIONS P162, P169, P168 & G 1402, REFERENCE EPOCH 2010.00 AT CONTROL POINT #1
VERTICAL DATUM: NAVD 88 BASED UPON GPS OBSERVATIONS, PROCESSED BY NGS OPUS WITH CORS STATIONS P162, P169, P168 & G 1402, REFERENCE EPOCH 2010.00 AT CONTROL POINT #1, USING GEOID12B.

UNDERGROUND UTILITY NOTE:
UNDERGROUND UTILITY INFORMATION SHOWN IS BASED ON VISIBLE EVIDENCE. SHN MAKES NO GUARANTEE REGARDING LOCATION, TYPE, SIZE, NOR PRESENCE OR ABSENCE OF UNDERGROUND UTILITIES.

OVERHEAD UTILITY NOTE:
OVERHEAD LINES OFF OF THE PROJECT SITE ARE NOT FULLY MAPPED. INFORMATION SHOWN IS BASED ON VISIBLE EVIDENCE. NO MAPPING OBTAINED FOR PHONE AND CABLE TELEVISION FACILITIES. PHONE AND CABLE TELEVISION LINE LOCATIONS NOT VERIFIED.

CERTIFICATION

THIS PLAT REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN APRIL, 2019.

MATTHEW T. HERMAN PLS 8335 DATE

PROFESSIONAL LAND SURVEYOR
MATTHEW T. HERMAN
Preliminary
Exp.12-31-19
8335
STATE OF CALIFORNIA

LEGEND

SYMBOL	INDICATES
CP# △	SURVEY CONTROL POINT = PROJECT BENCHMARKS
•	FOUND MONUMENT AS NOTED
—— – – ——	PROPERTY LINES
• BORE HOLE	GEO BORING

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. WABASH AVE. WWW.SHN-ENGR.COM
EUREKA, CA 95501 707-441-8855

NO.	DATE	REVISION	BY

DSGN	EWW	CHK	MTH
DR		APVD	

Royal Gold LLC
1689 Glendale Drive
McKinleyville, Humboldt County, California

Existing Conditions

DRAWING 1
SHT OF 1
DATE 04/2019
PROJ. NO. 016098

SAVED: 4/25/2019 1:29 PM, EWARD, PLOTTED: 4/25/2019 1:29 PM, ERIC W. WARD
\\EUREKA\PROJECTS\2016\016098A-ROYAL-GOLD\DWG\016098V.DWG

Project Site Climatic Assessment Data Sheet

2

1062 G St., Suite I, Arcata, CA 95521-5800 707-822-5785
Civil Engineering, Environmental Services, Geosciences, Planning & Permitting, Surveying

Project Site Climatic Assessment

Project: Royal Gold Mitigation Onsite Location: Royal Gold

Inspector: Sam Polly Date: 05/24/19

1. Annual Rainfall

- (●) Regional data available from : NOAA Eka
- (●) Regional listed annual average: 40.33"
- ( ) Local data available from: Obscure
- (●) Local listed average: 42.1-46" Arcata
- (●) Other: Record = 67.21" in 1983 (High) 16.60" in 2013 (Low)

2019: TTP
Jan 6.67 30.71
Feb 14.43
Mar 4.79
Apr 2.51
May 1-24 2.31

2012: June 2.00 Dec 10.97 total 50.77
Jan 7.76 July 0.67
Feb 2.63 Aug 0.07
Mar 12.02 Sept 0.04
Apr 4.76 Oct 2.72
May 0.77 Nov 6.36

6.5 5.63 + 4.79 + 3.32 + 1.78 = 22.02 = Normal AVG

Year	Location:Value	Location:Value	Notes
2019 to date	30.71"		22.02 = Normal AVG for Eka Jan-May
2018	Eka Woodley Isle WFO 36.75"		
2017	49.05"	shows hardy plants such as Juncus patens are beneficial	
2016	53.13"		
2015	33.84"		
2014	37.50"		
2013	16.60"		
2012	50.77"		

WRCC = 58.88" AVG Annual Blue Lake

2. Seasonal Rainfall

- (●) Regional data available from: NOAA Eka
- (●) Regional listed annual average(s): ~~Weather-US~~ NOAA CDO
- (●) Local data available from: NOAA Arcata
- (●) Local listed average(s): Weather-US
- ( ) Other:

Month	Location:Value (Recorded / Avg)	Location:Value	Notes Arcata AVG	WRCC Blue Lake
May to date	Eka WFO 2.31"	Arcata, NOAA CDO 2.59"	2.3 Weather-US	3.04
Apr	2.51 / 3.32	3.36"	2.5	4.22
Mar	4.79 / 5.30	5.27"	5.3	8.13
Feb	14.43 / 5.67	15.03"	6.3	10.73
Jan	6.67 / 6.5	7.16"	3.6	9.48
Dec '18	4.95" / 3.12	6.83"	6.7	8.46
Nov '18	4.94 / 5.61"	5.19"	4.9	9.09

Arcata Station @ 40.8809 -124.0692 128.0 US | CAHM0001 @ Dunbar Ct, Bay side

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3. Temperature Ella Woodl
- (●) Annual regional average: 30°F Low, 79°F High, 59.6°F AVG Max, 46.1°F AVG Min, 52.9°F Mean
- ( ) Monthly regional average(s):
- (●) Season actual: 29°F 73°F 59.2°F 46.0°F 52.6°F
- ( ) Monthly actual(s)
- ( ) Other:

Year	Location:Value	Location:Value	Notes
2018	Woodley Isle WFO 52.6°F		
2017	53.2		
2016	54.1		
2015	54.5		
2014	54.8		
2013			

Ella WFO Feb 17, 1930 = 85°F w/ 58°F = normal

Month	Location:Value	Location:Value	Notes
May	Ella WFO 53.5°F		Normal Ella 53.7
April	53.2		50.9
Mar	48.7		49.7
Feb	44.2		48.9
Jan	49.5		48.3
Dec	48.5		47.8
Nov	50.6		50.8

4. Water Issues
- (●) Flooding: overflow from unnamed intermittent stream along N. border
- (●) Ponding: Gouged, depressed, & graded areas collect precipitation
- (●) Excessive runoff: Flat slopes, veg, & variable topo prevent runoff
- ( ) Excessive runon: N/A
- ( ) Broken or leaking irrigation system or other anthropogenic source: NA
- ( ) Other:

5. Other Concerns/Observations
- ( )
- ( ) Appears ideal
- ( )

Notes:

Published Soil Orders

3

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Data Sheet

Job No. 016098.006
Page of

Project Name: Royal Gold Wetland mit BA	Client/Owner: Royal Gold	Weather: NA	
General Location of Work: Wetland Mit Area & Surrounding	Project Engineer: NA	Date	Day of Week: NA
Type of Work: Determine local soil orders	Supervisor: Bob Braun/Garry Rees	Technician: S. Polly	

MU 5 NRCS Soils around Royal Gold Wetland Mitigation Area

258	Lepoil (1)	Espa (2)	Candy mountain (3)
257	"		"
186	"	Timmons (4)	
531	Atwell (5)	Copper creek (6)	
580	Tectah (7)	"	Slidecreek (8)
171	Worswick (9)	Arlynda (10)	
185	Lepoil	Timmons	
110	Weott (11)		

Number	Taxonomic class
(1)	Fine-loamy, mixed, superactive, isomesic Typic Palehumults
(2)	" Haplohumults
(3)	Coarse loamy, " Humudepts
(4)	Fine-loamy, " mesic typic Palehumults
(5)	Fine, mixed, active, isomesic Oxyaquic Hapludalfs
(6)	Fineloamy, mixed, semi-active, isomesic typic Palehumults
(7)	Fine mixed, " "
(8)	Loamy-skeletal, "
(9)	Coarse-loamy, mixed, superactive, nonacid, isomesic, Fluvaquentic Endoaquepts
(10)	Fine-silty, " "
(11)	" "

Notes:

	Copy given to:	Reported By:

Mitigation Project Water Quality Assessment Data Sheets

4a

1062 G St., Suite I, Arcata, CA 95521-5800 707-822-5785
Civil Engineering, Environmental Services, Geosciences, Planning & Permitting, Surveying

Mitigation Project Water Quality Assessment

Project: Royal Gold Mitigation Onsite Location: WS 1

Inspector: Sam Polly Date & Time: 05-07-19 @ 6:28 pm

1. General Location Conditions:
   - (●) Vegetation amount/type: Oenanthe / Carex Obnupta / Alopecurus @ 50%; Alder/willow ~37%
   - (●) Bare areas (state reason): open water channel, banks mowed
   - ( ) Planting/topo zones missing
   - (●) Aquatic invertebrates present including insect larvae, water fleas, fairy shrimp, striders, whirligig
   - (●) Vertebrates present Frogs
   - (●) Shade: Low ~37% canopy dominant on S., open to E. & W.
   - (●) Water depth: 6"
   - ( ) Other:

2. Water Quality
   - (●) pH: 6.4
   - (●) Temperature 56.9°F
   - (●) Flow (speed if present) none apparent - side pool attached to channel
   - (●) Conductivity 71 ppm, 141 µs/cm
   - (●) Turbidity NTUs: 33.3, 34.2, 36.0 = 34.5
   - (●) Depth 7"
   - (●) Neighboring problems (circle: weed, sediment, runoff encroachment)
   - (●) Other: Adjacent heavy residential use

3. Climatic Data:
   - (●) Cloud cover 100%
   - ( ) WETS data
   - (●) Air temperature 59°F
   - (●) Wind 5 mph
   - ( ) Recent rainfall none
   - ( ) Ponding/flooding season onsite:
   - (●) Dissolved oxygen: 3.6 mg/L
   - (●) Other:

6. Other Concerns/Observations
   - (●) lots of sun due to open canopy ~ only 37% canopy
   - ( )
   - ( )

Notes:

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Mitigation Project Water Quality Assessment

Project: Royal Gold Mitigation Onsite Location: WS 2

Inspector: Sam Polly Date & Time: 05-07-19 @ 6:00 p.m.

1. General Location Conditions:
   - (●) Vegetation amount/type: 96% Carex obnupta + 90% willow/alder
   - (●) Bare areas (state reason): small open water patches from flooding
   - (●) Planting/topo zones missing
   - (●) Aquatic invertebrates present many - fairy shrimp, water fleas, striders
   - ( ) Vertebrates present
   - (●) Shade: ~90%
   - (●) Water depth: 6"
   - (●) Other: weeds @ low % but present

2. Water Quality
   - (●) pH: 6.5
   - (●) Temperature 53.8°F
   - (●) Flow (speed if present) none apparent
   - (●) Conductivity 100ppm; 202 45
   - (●) Turbidity NTUs: 50.2, ~~50.2~~ 27.2, 19.2 = 32.2
   - (●) Depth 6"
   - (●) Neighboring problems (circle: weed, sediment, runoff encroachment) Reed Canary Grass
   - (●) Other: very orange iron Leptothrix throughout column + sediment + sheen

3. Climatic Data:
   - (●) Cloud cover 100 %
   - ( ) WETS data
   - (●) Air temperature 59°F
   - (●) Wind Calm ~1mph
   - ( ) Recent rainfall none.
   - ( ) Ponding/flooding season onsite:
   - (●) Dissolved oxygen: 1.7 mg/L
   - ( ) Other:

6. Other Concerns/Observations
   - (●) Interesting apparent Carex leptopoda on small stump in shade
   - ( )
   - ( )

Notes:

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Mitigation Project Water Quality Assessment

Project: Royal Gold Mitigation Onsite Location: WS3

Inspector: Sam Polly Date & Time: 05-07-19 @ 5:40pm

1. General Location Conditions:
   - (●) Vegetation amount/type: 50% Carex obnupta & H2O Plantain; 50% willow over
   - (●) Bare areas (state reason): 50% from ponding & elk traffic
   - ( ) Planting/topo zones missing
   - (●) Aquatic invertebrates present many - fairy shrimp, water fleas, damselfly larvae
   - (●) Vertebrates present frogs
   - (●) Shade: ~50% but open to south = more light
   - (●) Water depth: 3-6"
   - ( ) Other:

2. Water Quality
   - (●) pH: 7.1
   - (●) Temperature 56.9°F
   - (●) Flow (speed if present) None
   - (●) Conductivity 177ppm, 356 µS
   - (●) Turbidity NTUs: 13.1, 11.2, 27.9 = 17.4
   - (●) Depth 3-6"
   - (●) Neighboring problems (circle: weed, sediment, runoff encroachment) Glyceria
   - (●) Other: Appears very clear

3. Climatic Data:
   - (●) Cloud cover 100%
   - ( ) WETS data
   - (●) Air temperature 57.0°F
   - (●) Wind ~2mph
   - ( ) Recent rainfall none
   - ( ) Ponding/flooding season onsite:
   - (●) Dissolved oxygen: 6.8 mg/L
   - ( ) Other:

6. Other Concerns/Observations
   - (●) 12' x 3' ditch hole in S. side of breach
   - ( )
   - ( )

Notes:

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Mitigation Project Water Quality Assessment

Project: Royal Gold Mitigation Onsite Location: WS 4.

Inspector: Sam Polly Date & Time: 05-07-19 @ 5:21pm

1. General Location Conditions:
   - (●) Vegetation amount/type: 50% Carex obnupta + 60% alder/willow over
   - (●) Bare areas (state reason): 50% ponding/flooding = open water
   - ( ) Planting/topo zones missing
   - (●) Aquatic invertebrates present many - fairy shrimp, water fleas, striders, whirligig
   - ( ) Vertebrates present
   - (●) Shade: ~60% cover = good, especially w/ S. wall of trees
   - (●) Water depth: 11"
   - (●) Other: Channel width ~ 30'

2. Water Quality
   - (●) pH: 6.2
   - (●) Temperature 56.3°F
   - (●) Flow (speed if present) Not noticeable but present based on up & downstream
   - (●) Conductivity 57 ppm, 114 µS
   - (●) Turbidity NTUs: 22.8, 19.4, 18.1 = 19.8
   - (●) Depth 11"
   - (●) Neighboring problems (circle: ~~weed~~, sediment, runoff encroachment) Reed Canary
   - (●) Other: Light gold, very translucent color

3. Climatic Data:
   - (●) Cloud cover 100%
   - ( ) WETS data
   - (●) Air temperature ~60.0°F
   - (●) Wind ~1 mph
   - ( ) Recent rainfall
   - ( ) Ponding/flooding season onsite:
   - (●) Dissolved oxygen: 1.9 mg/L
   - ( ) Other:

6. Other Concerns/Observations
   - (●) Scum & bubbles on surface
   - (●) ~1% Reed Canary Grass
   - (●) ~1% Oenanthe, Ranunculs, Rumex Crispus

Notes: Stream channel adjacent to breach
looks similar to local streams @ this point

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Mitigation Project Water Quality Assessment

Project: Wetland-Royal Gold Mitigation Onsite Location: WT5

Inspector: Sam Polly Date & Time: 05-07-19 @ 4:35 pm

1. General Location Conditions:
   - (a) Vegetation amount/type: Carex obnupta w Alder, Bay, Spruce, willow over
   - (b) Bare areas (state reason): ponding, minimal bare ~6%
   - ( ) Planting/topo zones missing
   - ( ) Aquatic invertebrates present no
   - ( ) Vertebrates present no
   - (f) Shade: heavy ~85% w light tunnel facing SW
   - (g) Water depth: 3"
   - ( ) Other:

2. Water Quality
   - (a) pH: 5.5
   - (b) Temperature 52.8°F
   - (c) Flow (speed if present) ~~NA~~ slow seepage from spring to SE
   - (d) Conductivity 28 ppm & 57 µS
   - (e) Turbidity NTUs: 17.7, 14.8, 14.1 = 15.5
   - (f) Depth 3"
   - ( ) Neighboring problems (circle: weed, sediment, runoff encroachment)
   - ( ) Other:

3. Climatic Data:
   - (a) Cloud cover 100%
   - ( ) WETS data
   - (c) Air temperature 63.5°F
   - (d) Wind 1 mph
   - ( ) Recent rainfall none
   - ( ) Ponding/flooding season onsite:
   - (g) Dissolved oxygen: 7.6 mg/L
   - ( ) Other:

6. Other Concerns/Observations
   - ( )
   - ( )
   - ( )

Notes: Appears very clear; back pool separated from channel
Soil sample taken

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Mitigation Project Water Quality Assessment

Project: Royal Gold Mitigation
Onsite Location: WS6
Inspector: Sam Polly
Date & Time: 05-07-19 @ 4:15 pm

1. General Location Conditions:
   - (●) Vegetation amount/type: 25% cattail in water, dense willow/alder overstory
   - (●) Bare areas (state reason): Ponding + Shade
   - ( ) Planting/topo zones missing
   - (●) Aquatic invertebrates present Numerous - fairy shrimp, water fleas, backswimmers, boatmen, diving beetles, whirligigs, striders, mosquitos, caddisfly
   - (●) Vertebrates present Frog sp + salamander juveniles
   - (●) Shade: Strong around perimeter w/ open center ~ 20' x 40'
   - (●) Water depth: 19"
   - (●) Other: water marks on tree trunks ~16" above water line

2. Water Quality
   - (●) pH: 7.1
   - (●) Temperature 59.1°F
   - (●) Flow (speed if present) NA
   - (●) Conductivity 147 ppm, 295 µS/cm
   - (●) Turbidity 61.1 NTU, 60.7, 61.2 = 61.0
   - (●) Depth 0-19"
   - (●) Neighboring problems (circle: weed, sediment, runoff encroachment)
   - (●) Other: Amber, translucent color

3. Climatic Data:
   - (●) Cloud cover 100%
   - ( ) WETS data
   - (●) Air temperature 56.5°F
   - (●) Wind ~5mph
   - ( ) Recent rainfall none
   - ( ) Ponding/flooding season onsite:
   - (●) Dissolved oxygen: 5.2 mg/L
   - ( ) Other:

6. Other Concerns/Observations
   - (●) Muddiest-looking water sample, appears opaque & brown
   - ( )
   - ( )

Notes:

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Mitigation Project Water Quality Assessment

Project: Royal Gold mitigation Onsite Location: WS 7

Inspector: Date & Time: 05-16-19 @ 11:30am

1. General Location Conditions:
   - (●) Vegetation amount/type: 94% willow & Alder canopy, no herbaceous/grass
   - (●) Bare areas (state reason): Entire pond = open water - ponding + shade + smaller pond size compared w/ WS 6
   - ( ) Planting/topo zones missing
   - (●) Aquatic invertebrates present many - same as WS 6
   - (●) Vertebrates present tadpoles
   - (●) Shade: Heavy w/ ~5% dappled sun
   - (●) Water depth: 6"
   - ( ) Other:

2. Water Quality
   - (●) pH: 6.8
   - (●) Temperature 57.3°F
   - (●) Flow (speed if present) none
   - (●) Conductivity 166 ppm, 335 uS/cm
   - (●) Turbidity NTUs: 24.4, 24.7, 24.7 = 24.6
   - (●) Depth 6" to 12" in middle
   - ( ) Neighboring problems (circle: weed, sediment, runoff encroachment)
   - ( ) Other:

3. Climatic Data:
   - (●) Cloud cover none - full sun
   - ( ) WETS data
   - (●) Air temperature
   - (●) Wind 3mph
   - (●) Recent rainfall none
   - ( ) Ponding/flooding season onsite:
   - (●) Dissolved oxygen: 1.5mg/L
   - ( ) Other:

6. Other Concerns/Observations
   - ( )
   - ( )
   - ( )

Notes: Appears very clear & high quality w/ many diverse aquatic inv

Dissolved Oxygen Water Quality Data 4b

May 09, 2019

SHN Consulting Engineers and Geologists
812 West Wabash Avenue
Eureka, CA 95501

Attn: Sam Polly

RE: 016098 Royal Gold

Order No.: 1905118
Invoice No.: 146308
PO No.:
ELAP No.1247-Expires July 2020

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	WS 1
02A	WS 2
03A	WS 3
04A	WS 4
05A	WS 5
06A	WS 6

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

Flag = Explanation in Case Narrative

All solid results are expressed on a wet-weight basis unless otherwise noted.

Approved for release by:

Roxanne Moore, Project Manager

Date: 09-May-2019
WorkOrder: 1905118

CASE NARRATIVE

Samples for pH, chlorine and dissolved oxygen analysis must be analyzed within 15 minutes of collection. Therefore, any samples requiring these analyses were analyzed past the official holding time.

Date: 09-May-2019
WorkOrder: 1905118

ANALYTICAL REPORT

Client Sample ID: WS 1
Lab ID: 1905118-01A
Received: 5/7/2019
Collected: 5/7/2019 15:04

Test Name: Dissolved Oxygen
Reference: SM 4500-OG, 2001. Revs 2011

Parameter	Result	Flag	Limit	Units	DF	Extracted	Analyzed
Dissolved Oxygen	3.6		0.50	mg/L	1.0		5/7/2019

Client Sample ID: WS 2
Lab ID: 1905118-02A
Received: 5/7/2019
Collected: 5/7/2019 15:22

Test Name: Dissolved Oxygen
Reference: SM 4500-OG, 2001. Revs 2011

Parameter	Result	Flag	Limit	Units	DF	Extracted	Analyzed
Dissolved Oxygen	1.7		0.50	mg/L	1.0		5/7/2019

Client Sample ID: WS 3
Lab ID: 1905118-03A
Received: 5/7/2019
Collected: 5/7/2019 15:28

Test Name: Dissolved Oxygen
Reference: SM 4500-OG, 2001. Revs 2011

Parameter	Result	Flag	Limit	Units	DF	Extracted	Analyzed
Dissolved Oxygen	6.8		0.50	mg/L	1.0		5/7/2019

Client Sample ID: WS 4
Lab ID: 1905118-04A
Received: 5/7/2019
Collected: 5/7/2019 15:31

Test Name: Dissolved Oxygen
Reference: SM 4500-OG, 2001. Revs 2011

Parameter	Result	Flag	Limit	Units	DF	Extracted	Analyzed
Dissolved Oxygen	1.9		0.50	mg/L	1.0		5/7/2019

Client Sample ID: WS 5
Lab ID: 1905118-05A
Received: 5/7/2019
Collected: 5/7/2019 15:35

Test Name: Dissolved Oxygen
Reference: SM 4500-OG, 2001. Revs 2011

Parameter	Result	Flag	Limit	Units	DF	Extracted	Analyzed
Dissolved Oxygen	3.6		0.50	mg/L	1.0		5/7/2019

Client Sample ID: WS 6
Lab ID: 1905118-06A
Received: 5/7/2019
Collected: 5/7/2019 15:43

Test Name: Dissolved Oxygen
Reference: SM 4500-OG, 2001. Revs 2011

Parameter	Result	Flag	Limit	Units	DF	Extracted	Analyzed
Dissolved Oxygen	5.2		0.50	mg/L	1.0		5/7/2019

P. 1 of 1

NORTH COAST LABORATORIES LTD.
5680 West End Road • Arcata • CA 95521-9202
707-822-4649 Fax 707-822-6831

Chain of Custody

LABORATORY NUMBER: 1905118

Attention: Sam Polly
Results & Invoice to: SHN
Address:
Phone: 707-822-5785
Copies of Report to: spolly@SHN-ENGR.com
Sampler (Sign & Print): Sam Polly

TAT: ☐ STD (2-3 Wk) ☒ Other: Priority
PRIOR AUTHORIZATION IS REQUIRED FOR RUSH SAMPLES.

REPORTING REQUIREMENTS:
☐ State Forms
☐ Geotracker ☐ SWAMP ☐ Other EDD:
☒ Final Report PDF ☐ FAX By:

PROJECT INFORMATION
Project Number: 016098
Project Name: Royal Gold
Purchase Order Number:

CONTAINER CODES: 1—½ gal. pl; 2—250 ml pl; 3—500 ml pl; 4—1 L Nalgene; 5—250 ml BG; 6—500 ml BG; 7—1 L BG; 8—40 ml VOA; 9—60 ml VOA; 10—125 ml VOA; 11—4 oz glass jar; 12—8 oz glass jar; 13—brass tube; 14—other
PRESERVATIVE CODES: a—HNO_3; b—HCl; c—H_2SO_4; d—$Na_2S_2O_3$; e—NaOH; f—$C_2H_3O_2Cl$; g—other

LAB ID	SAMPLE ID	DATE	TIME	MATRIX*	PRESERVATIVE	CONTAINER	ANALYSIS: Dissolved Oxygen
	WS 1	05-07-19	3:04	SW			X
	WS 2	↓	3:22	↓			X
	WS 3		3:28				X
	WS 4		3:31				X
	WS 5		3:35				X
	WS 6	↓	3:43	↓			X

SPECIAL INSTRUCTIONS	SAMPLE CONDITION
	Temperature 5.4 °C
	Received On Ice? (Y) / N
	Samples Intact? (Y) / N
	Preserved? Y / (N)
	Preserved @ NCL?
	(Y) / N / NA

RELINQUISHED BY (Sign & Print)	DATE/TIME	RECEIVED BY (Sign)	DATE/TIME
Sam Polly Sam Polly	5-7-19, 3:55	NAK	5/7/19
			4:09pm

SAMPLE DISPOSAL
☒ NCL Disposal of Non-Contaminated
☐ Return ☐ Pickup

CHAIN OF CUSTODY SEALS Y/N/NA
SHIPPED VIA: UPS /Fed-Ex (Hand)

*MATRIX: DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; WW=Waste Water; S=Soil; O=Other.

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

May 14, 2019

SHN Consulting Engineers and Geologists
812 West Wabash Avenue
Eureka, CA 95501

Attn: Sam Polly

RE: 016098 Royal Gold

Order No.: 1905173
Invoice No.: 146395
PO No.:
ELAP No.1247-Expires July 2020

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	WS 7

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

Flag = Explanation in Case Narrative

All solid results are expressed on a wet-weight basis unless otherwise noted.

Approved for release by:

Roxanne Moore, Project Manager

Date: 14-May-2019
WorkOrder: 1905173

CASE NARRATIVE

Samples for pH, chlorine and dissolved oxygen analysis must be analyzed within 15 minutes of collection. Therefore, any samples requiring these analyses were analyzed past the official holding time.

Date: 14-May-2019
WorkOrder: 1905173

ANALYTICAL REPORT

Client Sample ID: WS 7
Lab ID: 1905173-01A

Received: 5/10/2019
Collected: 5/10/2019 11:45

Test Name: Dissolved Oxygen
Reference: SM 4500-OG, 2001. Revs 2011

Parameter	Result	Flag	Limit	Units	DF	Extracted	Analyzed
Dissolved Oxygen	1.5		0.50	mg/L	1.0		5/10/2019

P. 1 of 1

NORTH COAST LABORATORIES LTD.
5680 West End Road • Arcata • CA 95521-9202
707-822-4649 Fax 707-822-6831

Chain of Custody

LABORATORY NUMBER: 1905173

Attention: Sam Polly
Results & Invoice to: SHN
Address:

Phone: 707-822-5785
Copies of Report to: spolly@shn-engr.com

Sampler (Sign & Print): Sam Polly Sam Polly

PROJECT INFORMATION
Project Number: 016098
Project Name: Royal Gold
Purchase Order Number:

TAT: ☒ STD (2-3 Wk) ☐ Other:
PRIOR AUTHORIZATION IS REQUIRED FOR RUSH SAMPLES.

REPORTING REQUIREMENTS:
☐ State Forms
☐ Geotracker ☐ SWAMP ☐ Other EDD:
☒ Final Report PDF ☐ FAX By:

CONTAINER CODES: 1—½ gal. pl; 2—250 ml pl; 3—500 ml pl; 4—1 L Nalgene; 5—250 ml BG; 6—500 ml BG; 7—1 L BG; 8—40 ml VOA; 9—60 ml VOA; 10—125 ml VOA; 11—4 oz glass jar; 12—8 oz glass jar; 13—brass tube; 14—other
PRESERVATIVE CODES: a—HNO_3; b—HCl; c—H_2SO_4; d—$Na_2S_2O_3$; e—NaOH; f—$C_2H_3O_2Cl$; g—other

LAB ID	SAMPLE ID	DATE	TIME	MATRIX*	PRESERVATIVE	CONTAINER	ANALYSIS: Dissolved Oxygen
	WS7	05-10-19	11:45	SW			X

SPECIAL INSTRUCTIONS	SAMPLE CONDITION
	Temperature 1.6 °C
	Received On Ice? (Y / N)
	Samples Intact? (Y / N)
	Preserved? Y (N)
	Preserved @ NCL? Y / N (NA)

RELINQUISHED BY (Sign & Print)	DATE/TIME	RECEIVED BY (Sign)	DATE/TIME
Sam Polly Sam Polly	05-10-19 1210	[signature] 5/10/19	1213

SAMPLE DISPOSAL
☒ NCL Disposal of Non-Contaminated
☐ Return ☐ Pickup

CHAIN OF CUSTODY SEALS Y/N/NA
SHIPPED VIA: UPS Fed-Ex Hand

*MATRIX: DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; WW=Waste Water; S=Soil; O=Other.

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Mitigation Project Site Assessment (Soils)

5a

1062 G St., Suite I, Arcata, CA 95521-5800 707-822-5785
Civil Engineering, Environmental Services, Geosciences, Planning & Permitting, Surveying

Mitigation Project Site Assessment

Project: Royal Gold Mitigation Onsite Location: MP 1

Inspector: Sam Polly Date: 04/26/19

1. Landscape General Concerns
   - ○ Soils unsuitable (state reason):
   - ○ Bare areas (state reason):
   - ◉ Planting/topo zones missing suitable but need grading
   - ◉ Lack of existing suitable species surrounding natives ideal
   - ○ Problematic access areas
   - ○ Boulder/log features lacking N/A
   - ◉ Other: weed seed load in-situ & adjacent

2. Environmental Concerns
   - ◉ Livestock, wildlife, pets (browsing, trampling, fecal burn) Elk & deer
   - ○ Site personnel or construction crews (parking, storing materials, having lunch in landscape)
   - ○ Foot traffic/physical disturbance (pedestrian shortcut, collision, vandalism)
   - ○ Infrastructure (exhaust vent burn, coolant discharge, etc.)
   - ○ Disease (white powdery mildew, sooty mold, curling leaves, blotches, shriveled bark, etc.)
   - ○ Insect/Pest (aphid, scale, thrip, psyllid, tent caterpillars, etc.)

   N/A

   - ◉ Neighboring problems (circle: weed, sediment, runoff encroachment)
   - ○ Other:

3. Water Issues
   - ◉ Unavailable water for spring/summer initial
   - ○ Excessive runoff
   - ○ Salt residue
   - ○ Broken or leaking irrigation system
   - ○ Water stress (wilting, stunting, or burning due to lack of water)
   - ○ Soil settling (cracks forming around root balls or in sediment beds)
   - ○ Flow scouring/erosion
   - ○ Other:

   N/A

4. Soil Requirements
- ○ Mulch
- ○ Staking
- ● Protection herbivore/gophers
- ○ Fertilization
- ○ Compaction alleviation
- ● Soil amendments OM @ surface
- ○ Supplemental water
- ○ Other:

5. Maintenance Concerns
- ● Weeds
- ○ Excessive dead plants requiring replacement
- ○ Mulch requiring addition
- ○ Pruning required
- ○ Other:

N/A

6. Other Concerns/Observations
- ○
- ○
- ○

Notes:

Prescriptions:

Soil Health Assessment

Soil Series Till Location MP 1 Land Use Idle – Wetland Mit

Parameter	Criteria	Value	Score
1. Soil Depth	>90 cm.	10	10
	60-90 cm.	4	
	<60 cm.	2	
2. A horizon	>6 cm.	10	10
	4-6 cm.	4	
	<4 cm.	2	
3. pH	6.0-7.5	10	10
	<6	4	
	>7.5	2	
4. Humus % (Estimated)	>3%	10	10
	1-3%	4	
	<1%	2	
5. Structure	Granular	10	10
	Fine Granular	4	
	Structureless/compact	2	
6. Texture (By Feel)	10-40% clay	10	10
	>40%	4	
	<10%	2	X
7. Biomass (Harvest Ring)	>2500 lbs./ac.	10	10
	1000-2000 lbs./ac.	4	
	<100	2	
8. Slope (Clinometer)	<2%	10	10
	2-8%	4	
	>8%	2	
9. Mottles mottles desired	None in top 90 cm.	10	2
	Mottles @ 60-90 cm.	4	
	Mottles in top 60 cm.	2	
10. Bioactivity	Worm sings, ants	10	10
	No worm signs	4	
	No organisms present	2	
11. Health Check (Adjustment)	Severe erosion seen	-10	
	>10% stoniness	-10	-10
	Subject to flooding	-10	

3. S.I adequate/ideal for wetland

6. @ excavation depth = CL

Add points in boxes 1-10 & subtract box 11 to get Soil Health Score: 82

Use the Soil Health Guide below to get the Soil Health Rating: Good: ✓ Moderate: ___ Severe: ___

1062 G St., Suite I, Arcata, CA 95521-5800 707-822-5785
Civil Engineering, Environmental Services, Geosciences, Planning & Permitting, Surveying

Soil Profile Description

General Location SW Corner of Mit Area Plot # MP1

Legal Description _____ Date 5-7-19

Natural Vegetation or Crop Non-native pasture grass Rainfall 39.14" / 49" % Slope 3

Parent Material Fill over CL Landform Alluvial Terrace Shape Linear Length 200'

Drainage Class Well/SW Poorly Hydraulic Cond. High / Low Aspect N Elevation 118'

Available H_2O Cap. NA Effective Depth V. Deep Runoff NA Soil Temp. NA

Horizon			Lower Depth (~~cm.~~ in.)	Bound. (dist., topo)	Structure			Color		Texture				Cons.		pH	Roots	Redox
Master	Sub.	No.			Grade	Size	Shape	Hue	V/C	% Co. Frag.	Clay %	Sand %	Tex. Class	D/M	S/P		Amt./Size	%/Color
1			5	Grad/Irr	2	F	GR	10YR	2/2	35	9	70	VgrSL	SH/EwC	SS/PS	5.8	m/F-VF	
2			19	Grad/Irr	2	F	GR	10YR	2/1	35	9	70	VgrSL	SH/EwC	SS/PS		m/F-VF	
~~4~~			~~32~~	~~Abrpt/smt~~	0	/	MA	10YR	5/6	5	40	25	CL	H/wC	S/P			
~~4~~			~~22~~		0	/	~~SG~~	2.5Y	3/3	~~60~~	~~5~~	~~85~~	~~VgrLoS~~	~~Loose/NA~~	~~SO/PO~~		~~F/F~~	
3			23	Abrpt/Smt	0	/	SG	2.5Y	2.5/1	60	5	85	ExGrCoLS	Loose/NA	SO/PO		F/F	

note

Notes: 3 = Driveway gravel
Sample taken of H1 & 2 on 5-7-19
Appears to be old fill to 23"

Rainfall is season to date Eureka / Onsite annual AVG

1062 G St., Suite I, Arcata, CA 95521-5800 707-822-5785
Civil Engineering, Environmental Services, Geosciences, Planning & Permitting, Surveying

Mitigation Project Site Assessment

Project: Royal Gold Mitigation Onsite Location: MP 2

Inspector: Date: 04/29/19

1. Landscape General Concerns
   - ○ Soils unsuitable (state reason):
   - ◉ Bare areas (state reason): Planting
   - ○ Planting/topo zones missing
   - ◔ Lack of existing suitable species Surrounding species ideal
   - ○ Problematic access areas
   - ○ Boulder/log features lacking
   - ◉ Other: In situ & surrounding weed seeds

2. Environmental Concerns
   - ◉ Livestock, wildlife, pets (browsing, trampling, fecal burn)
   - ○ Site personnel or construction crews (parking, storing materials, having lunch in landscape)
   - ○ Foot traffic/physical disturbance (pedestrian shortcut, collision, vandalism)
   - ○ Infrastructure (exhaust vent burn, coolant discharge, etc.)
   - ○ Disease (white powdery mildew, sooty mold, curling leaves, blotches, shriveled bark, etc.)
   - ○ Insect/Pest (aphid, scale, thrip, psyllid, tent caterpillars, etc.)
   - ◉ Neighboring problems (circle: weed, sediment, runoff encroachment)
   - ○ Other:

   N/A

3. Water Issues NA
   - ◉ Unavailable water for irrig if needed
   - ○ Excessive runoff
   - ○ Salt residue
   - ○ Broken or leaking irrigation system
   - ○ Water stress (wilting, stunting, or burning due to lack of water)
   - ○ Soil settling (cracks forming around root balls or in sediment beds)
   - ○ Flow scouring/erosion
   - ○ Other:

4. Soil Requirements
   - ◯ Mulch
   - ◯ Staking
   - ◉ Protection - from herbivory
   - ◯ Fertilization
   - ◯ Compaction alleviation
   - ◉ Soil amendments srfc OM
   - ◯ Supplemental water
   - ◯ Other:

5. Maintenance Concerns
   - ◉ Weeds
   - ◯ Excessive dead plants requiring replacement
   - ◯ Mulch requiring addition
   - ◯ Pruning required
   - ◯ Other:

6. Other Concerns/Observations
   - ◯
   - ◯
   - ◯

Notes:

Prescriptions:

Soil Health Assessment

Soil Series Fill Location MP2 Land Use Idle-Wetland

Parameter	Criteria	Value	Score
1. Soil Depth	>90 cm.	10	10
	60-90 cm.	4	
	<60 cm.	2	
2. A horizon	>6 cm.	10	10
	4-6 cm.	4	
	<4 cm.	2	
3. pH	6.0-7.5	10	10
	<6	4	
	>7.5	2	
4. Humus % (Estimated)	>3%	10	10
	1-3%	4	~~4~~
	<1%	2	
5. Structure	Granular	10	10
	Fine Granular	4	
	Structureless/compact	2	
6. Texture (By Feel)	10-40% clay	10	10
	>40%	4	
	<10%	2	
7. Biomass (Harvest Ring)	>2500 lbs./ac.	10	10
	1000-2000 lbs./ac.	4	
	<100	2	
8. Slope (Clinometer)	<2%	10	10
	2-8%	4	
	>8%	2	
9. Mottles	None in top 90 cm.	10	
	Mottles @ 60-90 cm.	4	10
	Mottles in top 60 cm.	2	
10. Bioactivity	Worm sings, ants	10	10
	No worm signs	4	
	No organisms present	2	
11. Health Check (Adjustment)	Severe erosion seen	-10	
	>10% stoniness	-10	
	Subject to flooding	-10	

5.7 adequate for wetland

100

Add points in boxes 1-10 & subtract box 11 to get Soil Health Score: ~~94~~ ✓

Use the Soil Health Guide below to get the Soil Health Rating: Good: ✓ Moderate: ___ Severe: ___

SHN
1062 G St., Suite I, Arcata, CA 95521-5800 707-822-5785
Civil Engineering, Environmental Services, Geosciences, Planning & Permitting, Surveying

Soil Profile Description

General Location ~40' SW of creek breach, ~60' W. of MP3 Plot # MP2

Legal Description _____ Date 04/29/19

Natural Vegetation or Crop mixed herbaceous Rainfall 39.14"/49" % Slope 0

Parent Material Fill over CL Landform Alluvial Terrace Shape Concave Length 100'

Drainage Class SW Poorly Hydraulic Cond. Mod / Mod Low Aspect _____ Elevation 117'

Available H_2O Cap. NA Effective Depth V. Deep Runoff NA Soil Temp. NA

Horizon			Lower Depth (~~cm.~~ in.)	Bound. (dist., topo)	Structure			Color		Texture				Cons.		pH	Roots	Redox	
Master	Sub.	No.			Grade	Size	Shape	Hue	V/C	% Co. Frag.	Clay %	Sand %	Tex. Class	D/M	S/P		Amt./Size	%/Color	
		1	5	A/W	m	F	GR	10YR	4/6	7	↑25	60	SCL	sh/f	s/p	5.7	m/F	—	
		2	23	A/W	MOD	F	SBK	10YR	3/4	15	20	60	SCL	sh/f	s/p		m/F	—	lots of woody debris
			25	C/W	S	m	BL	10YR	2/1	2	↑35	30	mCL	h/vf	vs/vp		m/F	2.5YR 2.5/3	
			30+		S	F	BL	10YR	3/1	1	↑35	30	MCL	h/vp	vs/vp		—	10YR 3/6	

Notes: GW fills to 24" quickly ~12" in previous hole from 4/26/19
Rainfall is season to date Eureka/Onsite annual AVG
2 hair lts of log deck woody debris, charcoal, less clay

1062 G St., Suite I, Arcata, CA 95521-5800 707-822-5785
Civil Engineering, Environmental Services, Geosciences, Planning & Permitting, Surveying

Mitigation Project Site Assessment

Project: Royal Gold Mitigation Onsite Location: MP 3

Inspector: Sam Polly Date: 04/29/19

1. Landscape General Concerns
   - ◯ Soils unsuitable (state reason):
   - ◯ Bare areas (state reason):
   - ◯ Planting/topo zones missing
   - ◯ Lack of existing suitable species
   - ◯ Problematic access areas
   - ◯ Boulder/log features lacking
   - ◉ Other: Surrounding & onsite weed seed

2. Environmental Concerns
   - ◉ Livestock, wildlife, pets (browsing, trampling, fecal burn)
   - ◯ Site personnel or construction crews (parking, storing materials, having lunch in landscape)
   - ◯ Foot traffic/physical disturbance (pedestrian shortcut, collision, vandalism)
   - ◯ Infrastructure (exhaust vent burn, coolant discharge, etc.)
   - ◯ Disease (white powdery mildew, sooty mold, curling leaves, blotches, shriveled bark, etc.)
   - ◯ Insect/Pest (aphid, scale, thrip, psyllid, tent caterpillars, etc.)
   - ◉ Neighboring problems (circle: weed, sediment, runoff encroachment)
   - ◯ Other:

3. Water Issues N/A
   - ◉ Unavailable water
   - ◯ Excessive runoff
   - ◯ Salt residue
   - ◯ Broken or leaking irrigation system
   - ◯ Water stress (wilting, stunting, or burning due to lack of water)
   - ◯ Soil settling (cracks forming around root balls or in sediment beds)
   - ◯ Flow scouring/erosion
   - ◉ Other: Pit filled to within ~ 12" since Friday 4/26/19

4. Soil Requirements
   - ◯ Mulch
   - ◯ Staking
   - ◉ Protection
   - ◯ Fertilization
   - ◯ Compaction alleviation
   - ◯ Soil amendments
   - ◯ Supplemental water
   - ◯ Other:

5. Maintenance Concerns
   - ◉ Weeds
   - ◯ Excessive dead plants requiring replacement
   - ◯ Mulch requiring addition
   - ◯ Pruning required
   - ◯ Other:

6. Other Concerns/Observations
   - ◯
   - ◯
   - ◯

Notes:

Prescriptions:

Soil Health Assessment

Soil Series Fill Location MP3 Land Use Idle - Wetland

Parameter	Criteria	Value	Score
1. Soil Depth	>90 cm.	10	10
	60-90 cm.	4	
	<60 cm.	2	
2. A horizon	>6 cm.	10	10
	4-6 cm.	4	
	<4 cm.	2	
3. pH	6.0-7.5	10	10
	<6	4	
	>7.5	2	
4. Humus % (Estimated)	>3%	10	
	1-3%	4	4
	<1%	2	
5. Structure	Granular	10	10
	Fine Granular	4	
	Structureless/compact	2	
6. Texture (By Feel)	10-40% clay	10	10
	>40%	4	
	<10%	2	
7. Biomass (Harvest Ring)	>2500 lbs./ac.	10	10
	1000-2000 lbs./ac.	4	
	<100	2	
8. Slope (Clinometer)	<2%	10	10
	2-8%	4	
	>8%	2	
9. Mottles required	None in top 90 cm.	10	
	Mottles @ 60-90 cm.	4	
	Mottles in top 60 cm.	2	10
10. Bioactivity	Worm sings, ants	10	10
	No worm signs	4	
	No organisms present	2	
11. Health Check (Adjustment) Yes = good	Severe erosion seen	-10	
	>10% stoniness	-10	
	Subject to flooding	-10	

Add points in boxes 1-10 & subtract box 11 to get Soil Health Score: 94

Use the Soil Health Guide below to get the Soil Health Rating: Good: ✓ Moderate: ___ Severe: ___

1062 G St., Suite I, Arcata, CA 95521-5800 707-822-5785
Civil Engineering, Environmental Services, Geosciences, Planning & Permitting, Surveying

Soil Profile Description

General Location Near willows in Scirpus east of breach, NW of MP 5, N of MP 4 Plot # MP 3

Legal Description _____ Date 04/29/19

Natural Vegetation or Crop Wetland Veg Rainfall 39.14" / 49" % Slope 1

Parent Material Fill over Wet Landform Alluvial Terrace Shape Concave Length 50'

Drainage Class SW Poorly Hydraulic Cond. Moderate Aspect _____ Elevation 117'

Available H_2O Cap. NA Effective Depth V. Deep Runoff NA Soil Temp. NA

Horizon			Lower Depth (cm.) (in.)	Bound. (dist., topo)	Structure			Color		Texture				Cons.		pH	Roots	Redox
Master	Sub.	No.			Grade	Size	Shape	Hue	V/C	% Co. Frag.	Clay %	Sand %	Tex. Class	D/M	S/P		Amt./Size	%/Color
1			7	abr/wav	M	FA	Gr	10YR	3/4	3	L20	65	SCL	s/vp	ss/ps		m/f-m	
2			24	abr/wav	W	F	SBK	10YR	4/6	~~7~~	720	50	L	s/vp	ss/ps		m/f-m	10YR 4/4 +2.5YR 4/6
3			36	/	/	/	Mg	10YR	2/1	0			mucky	s/vf	ss/ps		0	

Notes: Top 24" appears to be fill w/ an A hzn dulps in top 7" from biomass; Rainfall = Ella to date/onsite annual AVG
Dry srfc but H2O table ~ 1'
2nd hzn same as MP 5 srfc hzn; bottom = mucky buried wet w/ large woody debris

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Mitigation Project Site Assessment

Project: Royal Gold Mitigation Onsite Location: MP4

Inspector: Sam Polly Date: 05-07-19

1. Landscape General Concerns
   - (●) Soils unsuitable (state reason): High infiltration, high topo
   - ( ) Bare areas (state reason):
   - ( ) Planting/topo zones missing
   - ( ) Lack of existing suitable species
   - ( ) Problematic access areas
   - ( ) Boulder/log features lacking
   - (●) Other: surrounding weed load

2. Environmental Concerns
   - (●) Livestock, wildlife, pets (browsing, trampling, fecal burn)
   - ( ) Site personnel or construction crews (parking, storing materials, having lunch in landscape)
   - ( ) Foot traffic/physical disturbance (pedestrian shortcut, collision, vandalism)
   - ( ) Infrastructure (exhaust vent burn, coolant discharge, etc.)
   - ( ) Disease (white powdery mildew, sooty mold, curling leaves, blotches, shriveled bark, etc.)
   - ( ) Insect/Pest (aphid, scale, thrip, psyllid, tent caterpillars, etc.)
   - (●) Neighboring problems (circle: weed, sediment, runoff encroachment)
   - ( ) Other:

3. Water Issues NA
   - ( ) Unavailable water
   - ( ) Excessive runoff
   - ( ) Salt residue
   - ( ) Broken or leaking irrigation system
   - ( ) Water stress (wilting, stunting, or burning due to lack of water)
   - ( ) Soil settling (cracks forming around root balls or in sediment beds)
   - ( ) Flow scouring/erosion
   - ( ) Other:

4. Soil Requirements
   - ○ Mulch
   - ○ Staking
   - ◉ Protection herbivory
   - ○ Fertilization
   - ○ Compaction alleviation
   - ◉ Soil amendments OM
   - ○ Supplemental water
   - ○ Other:

5. Maintenance Concerns
   - ◉ Weeds
   - ○ Excessive dead plants requiring replacement
   - ○ Mulch requiring addition
   - ○ Pruning required
   - ○ Other:

6. Other Concerns/Observations
   - ○
   - ○
   - ○

Notes: Loy dell type soil sampled @ MP1 over orange soil sampled @ MP5, both typical of site

Prescriptions:

Soil Health Assessment

Soil Series Tama Location MP4 Land Use Idle-

Parameter	Criteria	Value	Score
1. Soil Depth	>90 cm.	10	10
	60-90 cm.	4	
	<60 cm.	2	
2. A horizon	>6 cm.	10	10
	4-6 cm.	4	
	<4 cm.	2	
3. pH	6.0-7.5	10	10
	<6	4	
	>7.5	2	
4. Humus % (Estimated)	>3%	10	10
	1-3%	4	
	<1%	2	
5. Structure	Granular	10	10
	Fine Granular	4	
	Structureless/compact	2	
6. Texture (By Feel)	10-40% clay	10	
	>40%	4	
	<10%	2	2
7. Biomass (Harvest Ring)	>2500 lbs./ac.	10	10
	1000-2000 lbs./ac.	4	
	<100	2	
8. Slope (Clinometer)	<2%	10	10
	2-8%	4	
	>8%	2	
9. Mottles	None in top 90 cm.	10	2
	Mottles @ 60-90 cm.	4	
	Mottles in top 60 cm.	2	
10. Bioactivity	Worm sings, ants	10	10
	No worm signs	4	
	No organisms present	2	
11. Health Check (Adjustment)	Severe erosion seen	-10	
	>10% stoniness	-10	-10
	Subject to flooding	-10	

Add points in boxes 1-10 & subtract box 11 to get Soil Health Score: 74

Use the Soil Health Guide below to get the Soil Health Rating: Good: ✓ Moderate: ___ Severe: ___

SHN
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Soil Profile Description

General Location ~35' WSW of MP5, ~100' SSE of MP3 Plot # MP4

Legal Description ______ Date 05/07/19

Natural Vegetation or Crop Non-native pasture grasses Rainfall 39.14"/49" % Slope 1

Parent Material Fill/All/Res Landform St. Terrace Shape Linear Length 200'

Drainage Class /M. Well Hydraulic Cond. /Mod Low Aspect N Elevation 116'

Available H_2O Cap. NA Effective Depth Very Deep Runoff NA Soil Temp. NA

Horizon			Lower Depth ~~(cm.)~~ (in.)	Bound. (dist., topo)	Structure			Color		Texture				Cons.		pH	Roots	Redox
Master	Sub.	No.			Grade	Size	Shape	Hue	V/C	% Co. Frag.	Clay %	Sand %	Tex. Class	D/M	S/P		Amt./Size	%/Color
1			7	Grad/Irr	2	F	GR	10YR	2/2	35	9	70	Vgr SL	SH/Ewc	SS/PS	5.1	M/M-VF	/
2			13	Abt/Smt	2	F	GR	10YR	2/1	35	9	70	Vgr SL	SH/Ewc	SS/PS		M/M-VF	/
3			30	Abt/Wvy	/	/	MA	2.5YR	4/6	8	12	55	SL	MH/VWC	SS/PS		VF/F	/
4			36	Grad/Wvy	1	M	GR	10YR	2/2	35	12	70	VGr SL	Sft/NonCe	SS/PS		/	/
5			40+	/	/	/	MA	Mixed		5	35	45	CL	H/WC	S/P		/	/

Notes: ~9% OM in srfc, ~0% in 2nd hzn Rainfall = ELN season to date / onsite annual AVG

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Mitigation Project Site Assessment

Project: Royal Gold Mitigation Onsite Location: MPS

Inspector: Sam Pilly Date: 04/29/19

1. Landscape General Concerns
   - ○ Soils unsuitable (state reason): TBD
   - ◉ Bare areas (state reason): Compaction, Scraping, & Ponding
   - ○ Planting/topo zones missing
   - ○ Lack of existing suitable species
   - ○ Problematic access areas
   - ○ Boulder/log features lacking
   - ◉ Other: Surrounding weeds

2. Environmental Concerns
   - ◉ Livestock, wildlife, pets (browsing, trampling, fecal burn)
   - ○ Site personnel or construction crews (parking, storing materials, having lunch in landscape)
   - ○ Foot traffic/physical disturbance (pedestrian shortcut, collision, vandalism)
   - ○ Infrastructure (exhaust vent burn, coolant discharge, etc.)
   - ○ Disease (white powdery mildew, sooty mold, curling leaves, blotches, shriveled bark, etc.)
   - ○ Insect/Pest (aphid, scale, thrip, psyllid, tent caterpillars, etc.)
   - ◉ Neighboring problems (circle: weed, sediment, runoff encroachment)
   - ○ Other:

3. Water Issues
   - ◉ Unavailable water
   - ○ Excessive runoff
   - ○ Salt residue
   - ○ Broken or leaking irrigation system
   - ○ Water stress (wilting, stunting, or burning due to lack of water)
   - ○ Soil settling (cracks forming around root balls or in sediment beds)
   - ○ Flow scouring/erosion
   - ◉ Other: Pit filled up to about 1' from surface since Friday 4/26 Will need to be planted when soils are accessible

4. Soil Requirements
   - ○ Mulch
   - ○ Staking
   - ◉ Protection herbivory
   - ○ Fertilization
   - ◉ Compaction alleviation
   - ○ Soil amendments TBD
   - ◉ Supplemental water if needed during establishment
   - ◉ Other: lacking OM to 25"

5. Maintenance Concerns
   - ◉ Weeds
   - ○ Excessive dead plants requiring replacement
   - ○ Mulch requiring addition
   - ○ Pruning required
   - ○ Other:

6. Other Concerns/Observations
   - ○
   - ○
   - ○

Notes:

Prescriptions:

Soil Health Assessment

Soil Series Fill Location mp 5 Land Use Idle

Parameter	Criteria	Value	Score	
1. Soil Depth	>90 cm.	10	10	
	60-90 cm.	4		
	<60 cm.	2		
2. A horizon	>6 cm.	10		
	4-6 cm.	4		
	<4 cm.	2	2	
3. pH	6.0-7.5	10	~~10~~ 10	
	<6 5.1	4		
	>7.5	2		
4. Humus % (Estimated)	>3%	10		
	1-3% 2%	4		
	<1%	2	2	
5. Structure	Granular	10	10	
	Fine Granular	4		
	Structureless/compact	2		
6. Texture (By Feel)	10-40% clay	10	10	
	>40%	4		
	<10%	2		
7. Biomass (Harvest Ring)	>2500 lbs./ac.	10		
	1000-2000 lbs./ac.	4	4	Compaction
	<100	2		
8. Slope (Clinometer)	<2%	10	10	
	2-8%	4		
	>8%	2		
9. Mottles	None in top 90 cm.	10		None due to recent disturbance
Required in this case	Mottles @ 60-90 cm.	4		so assumed
	Mottles in top 60 cm.	2	10	
10. Bioactivity	Worm sings, ants	10	10	
	No worm signs	4		
	No organisms present	2		
11. Health Check (Adjustment)	Severe erosion seen	-10		
	>10% stoniness	-10		
preferred →	Subject to flooding	-10		so okay

Add points in boxes 1-10 & subtract box 11 to get Soil Health Score: 78

Use the Soil Health Guide below to get the Soil Health Rating: Good: ✓ Moderate: ___ Severe: ___

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Soil Profile Description

General Location 3/5 N. of berm, ~30yd S.E. Breach of Creek, W. edge of E. palustris pool Plot # MP 5

Legal Description _____ Date 04/29/19

Natural Vegetation or Crop Recently emerged wetland veg Rainfall 39.14"/49" % Slope 1

Parent Material Hist. Ind. Fill Landform Stream/Alluvial Terr Shape Concave w/n linear Length 90'

Drainage Class Mod Well Hydraulic Cond. ModL/ModL Aspect North Elevation 117'

Available H_2O Cap. NA Effective Depth Very Deep Runoff NA Soil Temp. NA

Horizon			Lower Depth (~~cm.~~) (in.)	Bound. (dist., topo)	Structure			Color		Texture				Cons.		pH	Roots	Redox	
Master	Sub.	No.			Grade	Size	Shape	Hue	V/C	% Co. Frag.	Clay %	Sand %	Tex. Class	D/M	S/P		Amt./Size	%/Color	
I	/	/	25	Abrupt Wavy	3	M^vc	GR	10YR	5/6	8	31	36	CL	MH/vw	SS/P	5.1	C/m	2.5YR 4/6: 36	%
2	/	/	36+	/	2	Co	GR	10YR	3/1	36	27	59	Vgr SCL	So/NC	SS/PS		0	2.5YR 2.5/3:	6%

Notes: Basically no OM in srfc hzn.
Noticeable volume of woody debris in 2nd hzn.;
Veg includes Eleocharis palustris sward
Sample taken (composite)
0-25" is orange horizon typical of site
Rainfall = EKa season total/onsite annual AVG

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Mitigation Project Site Assessment

Project: Royal Gold Mit

Onsite Location: MP 6, WS 4

Inspector: Sam

Date: 05/14/19

1. Landscape General Concerns
   - (●) Soils unsuitable (state reason): ponding + shade
   - ( ) Bare areas (state reason):
   - ( ) Planting/topo zones missing
   - ( ) Lack of existing suitable species
   - ( ) Problematic access areas
   - ( ) Boulder/log features lacking
   - (●) Other: weed load

2. Environmental Concerns
   - (●) Livestock, wildlife, pets (browsing, trampling, fecal burn)
   - ( ) Site personnel or construction crews (parking, storing materials, having lunch in landscape)
   - ( ) Foot traffic/physical disturbance (pedestrian shortcut, collision, vandalism)
   - ( ) Infrastructure (exhaust vent burn, coolant discharge, etc.)
   - ( ) Disease (white powdery mildew, sooty mold, curling leaves, blotches, shriveled bark, etc.)
   - ( ) Insect/Pest (aphid, scale, thrip, psyllid, tent caterpillars, etc.)
   - (●) Neighboring problems (circle: weed, sediment, runoff encroachment) Reed Canary
   - ( ) Other:

3. Water Issues
   - ( ) Unavailable water
   - ( ) Excessive runoff
   - ( ) Salt residue
   - ( ) Broken or leaking irrigation system
   - ( ) Water stress (wilting, stunting, or burning due to lack of water)
   - ( ) Soil settling (cracks forming around root balls or in sediment beds)
   - ( ) Flow scouring/erosion
   - ( ) Other:

NA

4. Soil Requirements
   - ○ Mulch
   - ○ Staking
   - ◉ Protection herbivory
   - ○ Fertilization
   - ○ Compaction alleviation
   - ◉ Soil amendments am
   - ○ Supplemental water
   - ○ Other:

5. Maintenance Concerns
   - ◉ Weeds
   - ○ Excessive dead plants requiring replacement
   - ○ Mulch requiring addition
   - ○ Pruning required
   - ○ Other:

6. Other Concerns/Observations
   - ○
   - ○
   - ○

Notes:

Prescriptions:

Soil Health Assessment

Soil Series Fill Location MP 6 Land Use Idle-Wet

Parameter	Criteria	Value	Score
1. Soil Depth	>90 cm.	10	10
	60-90 cm.	4	
	<60 cm.	2	
2. A horizon	>6 cm.	10	10
	4-6 cm.	4	
	<4 cm.	2	
3. pH	6.0-7.5	10	10
	<6	4	
	>7.5	2	
4. Humus % (Estimated)	>3%	10	10
	1-3%	4	
	<1%	2	
5. Structure	Granular	10	10
	Fine Granular	4	
	Structureless/compact	2	
6. Texture (By Feel)	10-40% clay	10	10
	>40%	4	
	<10%	2	
7. Biomass (Harvest Ring)	>2500 lbs./ac.	10	10
	1000-2000 lbs./ac.	4	
	<100	2	
8. Slope (Clinometer)	<2%	10	10
	2-8%	4	
	>8%	2	
9. Mottles	None in top 90 cm.	10	10
	Mottles @ 60-90 cm.	4	
	Mottles in top 60 cm.	2	
10. Bioactivity	Worm sings, ants	10	10
	No worm signs	4	
	No organisms present	2	
11. Health Check (Adjustment)	Severe erosion seen	-10	
	>10% stoniness	-10	
	Subject to flooding	-10	

Add points in boxes 1-10 & subtract box 11 to get Soil Health Score: 100

Use the Soil Health Guide below to get the Soil Health Rating: Good: ✓ Moderate: ___ Severe: ___

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Soil Profile Description

General Location N. Central w/ intermittent Stream Plot # MP 6, WS4

Legal Description _____ Date 05/14/19

Natural Vegetation or Crop Carex obnupta w/ willow & alder Rainfall 39.14" /49" % Slope 0

Parent Material Alluvium Landform Stream Shape Linear Length 680'

Drainage Class — Hydraulic Cond. — Aspect — Elevation 116'

Available H_2O Cap. NA Effective Depth — Runoff NA Soil Temp. NA

Horizon			Lower Depth (cm.)	Bound. (dist., topo)	Structure			Color		Texture				Cons.		pH	Roots	Redox
Master	Sub.	No.			Grade	Size	Shape	Hue	V/C	% Co. Frag.	Clay %	Sand %	Tex. Class	D/M	S/P		Amt./Size	%/Color
1			12+	/	M	m	Gr	10YR	2/2	2	10	65	SL	Loose	50/50		M/F-VC	

Notes: Too many roots to get deeper
Very similar all along

Standing water / flowing water
Rainfall = Elka season total / Onsite annual AVG

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Mitigation Project Site Assessment

Project: Royal Gold Mit

Onsite Location: WS5, MP7

Inspector: Sam Polly

Date: 05/14/19

1. Landscape General Concerns
   - ◯ Soils unsuitable (state reason):
   - ◯ Bare areas (state reason):
   - ◯ Planting/topo zones missing
   - ◯ Lack of existing suitable species
   - ◯ Problematic access areas
   - ◯ Boulder/log features lacking
   - ◯ Other:

   NA

2. Environmental Concerns
   - ◉ Livestock, wildlife, pets (browsing, trampling, fecal burn)
   - ◯ Site personnel or construction crews (parking, storing materials, having lunch in landscape)
   - ◯ Foot traffic/physical disturbance (pedestrian shortcut, collision, vandalism)
   - ◯ Infrastructure (exhaust vent burn, coolant discharge, etc.)
   - ◯ Disease (white powdery mildew, sooty mold, curling leaves, blotches, shriveled bark, etc.)
   - ◯ Insect/Pest (aphid, scale, thrip, psyllid, tent caterpillars, etc.)
   - ◉ Neighboring problems (circle: weed, sediment, runoff encroachment)
   - ◯ Other:

3. Water Issues
   - ◯ Unavailable water
   - ◯ Excessive runoff
   - ◯ Salt residue
   - ◯ Broken or leaking irrigation system
   - ◯ Water stress (wilting, stunting, or burning due to lack of water)
   - ◯ Soil settling (cracks forming around root balls or in sediment beds)
   - ◯ Flow scouring/erosion
   - ◯ Other:

   NA

4. Soil Requirements
- ○ Mulch
- ○ Staking
- ◉ Protection herbivory
- ○ Fertilization
- ○ Compaction alleviation
- ○ Soil amendments
- ○ Supplemental water
- ○ Other:

5. Maintenance Concerns
- ◉ Weeds
- ○ Excessive dead plants requiring replacement
- ○ Mulch requiring addition
- ○ Pruning required
- ○ Other:

6. Other Concerns/Observations
- ○
- ○
- ○

Notes: This is an existing wetland area

Prescriptions:

Soil Health Assessment

Soil Series LA Location WS5/MP7 Land Use Idle

Parameter	Criteria	Value	Score
1. Soil Depth	>90 cm.	10	10
	60-90 cm.	4	
	<60 cm.	2	
2. A horizon	>6 cm.	10	10
	4-6 cm.	4	
	<4 cm.	2	
3. pH	6.0-7.5	10	10
	<6	4	
	>7.5	2	
4. Humus % (Estimated)	>3%	10	10
	1-3%	4	
	<1%	2	
5. Structure	Granular	10	10
	Fine Granular	4	
	Structureless/compact	2	
6. Texture (By Feel)	10-40% clay	10	10
	>40%	4	
	<10%	2	
7. Biomass (Harvest Ring)	>2500 lbs./ac.	10	10
	1000-2000 lbs./ac.	4	
	<100	2	
8. Slope (Clinometer)	<2%	10	10
	2-8%	4	
	>8%	2	
9. Mottles	None in top 90 cm.	10	
	Mottles @ 60-90 cm.	4	
	Mottles in top 60 cm.	2	10
10. Bioactivity	Worm sings, ants	10	10
	No worm signs	4	
	No organisms present	2	
11. Health Check (Adjustment)	Severe erosion seen	-10	
	>10% stoniness	-10	
	Subject to flooding	-10	

Add points in boxes 1-10 & subtract box 11 to get Soil Health Score: 100

Use the Soil Health Guide below to get the Soil Health Rating: Good: ✓ Moderate: ___ Severe: ___

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Soil Profile Description

General Location NE Corner of site by neighbor culvert Plot # WS5/MP7

Legal Description _____ Date 05/14/19

Natural Vegetation or Crop Carex obnupta w/ alder/willow Rainfall 39.14" / 49" % Slope —

Parent Material Alluvium/Fill Landform Stream Shape Linear Length 20'

Drainage Class — Hydraulic Cond. — Aspect — Elevation 117'

Available H_2O Cap. NA Effective Depth — Runoff NA Soil Temp. _____

Horizon			Lower Depth (cm.) in.	Bound. (dist., topo)	Structure			Color		Texture				Cons.		pH	Roots	Redox
Master	Sub.	No.			Grade	Size	Shape	Hue	V/C	% Co. Frag.	Clay %	Sand %	Tex. Class	D/M	S/P		Amt./Size	%/Color
O/A			2	Ab/wvy	2	F	Gr/sbk	10YR	2/1				MPSL	Loose	SO/PO		3/F-VCo	
2			5	Ab/wvy	2	Co	Gr	~~10~~ 7.5YR	3/2	8	10	50	L	SH/EWC	SS/PS		3/F-VCo	~~10YR 5/6 6%~~ ~~10YR 2/1 3%~~ 4% 7.5YR 4/4
3			12+	—	2	M	SBK	10YR	3/3	8	12	50	L	SH/EWC	SS/PS		3/F-VCo	10YR 5/6 6% 10YR 2/1 3%

Notes: Surface water & saturation throughout, aquatic invertebrates & flow

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Mitigation Project Site Assessment

Project: Royal Gold Mit

Onsite Location: WS6, MP 8

Inspector: Sam Polly

Date: 05/14/19

1. Landscape General Concerns
   - ◯ Soils unsuitable (state reason):
   - ◯ Bare areas (state reason):
   - ◯ Planting/topo zones missing
   - ◯ Lack of existing suitable species
   - ◯ Problematic access areas
   - ◯ Boulder/log features lacking
   - ◉ Other: Adjacent weed seed

2. Environmental Concerns
   - ◉ Livestock, wildlife, pets (browsing, trampling, fecal burn)
   - ◯ Site personnel or construction crews (parking, storing materials, having lunch in landscape)
   - ◯ Foot traffic/physical disturbance (pedestrian shortcut, collision, vandalism)
   - ◯ Infrastructure (exhaust vent burn, coolant discharge, etc.)
   - ◯ Disease (white powdery mildew, sooty mold, curling leaves, blotches, shriveled bark, etc.)
   - ◯ Insect/Pest (aphid, scale, thrip, psyllid, tent caterpillars, etc.)
   - ◉ Neighboring problems (circle: weed, sediment, runoff encroachment)
   - ◯ Other:

3. Water Issues
   - ◯ Unavailable water
   - ◯ Excessive runoff
   - ◯ Salt residue
   - ◯ Broken or leaking irrigation system
   - ◯ Water stress (wilting, stunting, or burning due to lack of water)
   - ◯ Soil settling (cracks forming around root balls or in sediment beds)
   - ◯ Flow scouring/erosion
   - ◯ Other:

NA

4. Soil Requirements
   - ◯ Mulch
   - ◯ Staking
   - ◉ Protection herbivory
   - ◯ Fertilization
   - ◯ Compaction alleviation
   - ◯ Soil amendments
   - ◯ Supplemental water
   - ◯ Other:

5. Maintenance Concerns
   - ◉ Weeds
   - ◯ Excessive dead plants requiring replacement
   - ◯ Mulch requiring addition
   - ◯ Pruning required
   - ◯ Other:

6. Other Concerns/Observations
   - ◯
   - ◯
   - ◯

Notes:

Prescriptions:

Soil Health Assessment

Soil Series Fill Location MP 3 – WS6 Land Use Fd/e – Wetland

Parameter	Criteria	Value	Score
1. Soil Depth	>90 cm.	10	10
	60-90 cm.	4	___
	<60 cm.	2	___
2. A horizon	>6 cm.	10	10
	4-6 cm.	4	___
	<4 cm.	2	___
3. pH	6.0-7.5	10	10
	<6	4	___
	>7.5	2	___
4. Humus % (Estimated)	>3%	10	10
	1-3%	4	___
	<1%	2	___
5. Structure	Granular	10	10
	Fine Granular	4	___
	Structureless/compact	2	___
6. Texture (By Feel)	10-40% clay	10	10
	>40%	4	___
	<10%	2	___
7. Biomass (Harvest Ring)	>2500 lbs./ac.	10	10
	1000-2000 lbs./ac.	4	___
	<100	2	___
8. Slope (Clinometer)	<2%	10	10
	2-8%	4	___
	>8%	2	___
9. Mottles	None in top 90 cm.	10	10
	Mottles @ 60-90 cm.	4	___
	Mottles in top 60 cm.	2	___
10. Bioactivity	Worm sings, ants	10	10
	No worm signs	4	___
	No organisms present	2	___
11. Health Check (Adjustment)	Severe erosion seen	-10	___
	>10% stoniness	-10	___
	Subject to flooding	-10	___

Add points in boxes 1-10 & subtract box 11 to get Soil Health Score: 100

Use the Soil Health Guide below to get the Soil Health Rating: Good: ✓ Moderate: ___ Severe: ___

1062 G St., Suite I, Arcata, CA 95521-5800 707-822-5785
Civil Engineering, Environmental Services, Geosciences, Planning & Permitting, Surveying

Soil Profile Description

General Location Central portion of Eastern boundary e ponds Plot # WS6, MP8

Legal Description _____ Date 05/14/19

Natural Vegetation or Crop Native hydrophytes Rainfall 39.14"/49" % Slope —

Parent Material Alluvium/Fill Landform Pan on Alluvial Terr Shape Concave Length NA

Drainage Class Very Poorly Drained Hydraulic Cond. Mod Low Aspect — Elevation 107'

Available H_2O Cap. NA Effective Depth Deep Runoff NA Soil Temp. NA

Horizon			Lower Depth (~~cm.~~) in.	Bound. (dist., topo)	Structure			Color		Texture				Cons.		pH	Roots	Redox
Master	Sub.	No.			Grade	Size	Shape	Hue	V/C	% Co. Frag.	Clay %	Sand %	Tex. Class	D/M	S/P		Amt./Size	%/Color
		1	3	C/W	m	f	Gr	10YR 3/2	3/2	2	35	20	S:CL	SH/f	SS/PS		m/F-VF	5YR 3/4 20%
		2	8	C/W	WK	m	SBK	7.5YR	2.5/1	3	35	20	S:CL	SH/f	SS/PS		C/F-m	5YR 3/3 25%
		3	12+	/	/	/	MA	7.5YR	2.5/1	1	20	50	L	S/vf	SO/PO		MK C/F-m	5YR 3/4 15%

Notes: Surface water x' numerous aquatic inverts + amphibians Lots of woody debris, roots + peat = very dense
Moist pond sediment @ 5YR 3/4 appears very orange
Ponds dried by August but W. Pond refilled to ~4" afterrain

Soil Health Guide

Good	70-100 Soils having this rating are in excellent productive health
Moderate	40-70 Soils needing restoration measures and erosion control
Severe	20-40 Soils needing major restoration work and erosion control

Notes

This scale is based upon local conditions in Central California coastal valleys. The scale and guide may need modification when used in other areas.

Keep in mind time of year: soils may be more acidic during growing season due to organic acids exuding from plant roots; winter or dry season die-back of plants will reduce biomass; alluvial soils (such as Russ and Ferndale series) may show little humus yet be the most productive local soils.

This sheet can be simplified for younger students, such as relegating pH to neutral, acidic or basic. A demonstration with baking soda and vinegar can illustrate the concept. Humus can be termed darkness vs. lightness, structure can be termed cloddy, etc.

Parameter

1&2	Depth and surface horizon can be analyzed with a tape measure by digging a pit or looking at a roadcut.
3	pH can be found in the local soil survey, determined with a pH test kit or guessed by local professionals.
4	Humus can be estimated by the darkness of the topsoil and by the location. A desert soil, graded construction site or vacant city lot with compacted soil will typically be <1%. A forest or grassland will be >3%.
5	Structure can be determined by comparing to soil structure photos online or in a book. Beach sand and cement are both structureless. Small clods seen on gopher or mole mounds are granules.
7	Biomass can be determined by randomly throwing a 1 square foot ring or square onto the site, harvesting the vegetation with grass clippers and weighing the biomass. A number of samples can be taken, after which the average can be computed out to the acreage basis (43,560ft^2/acre).
8	Slope can be estimated comparing to a protractor, if a clinometer or Abney level is not available.
9	Mottles can be expected in wetland areas or areas of high clay, where the soil is moist for long periods. Look for splotches of blue-grey mixed with the reddish or yellowish soil, or vice-versa. Mottles indicate cycles of wetting and drying, which cause alternate oxidation and reduction, the same chemical reaction that causes red blood to turn blue or purple in a bruise, due to your blood's iron being reduced.

Assessment

1. Go to the printed soil survey for your area or to the Natural Resoures Conservation Service (NRCS) website at http://soils.usda.gov/survey/printed_surveys/state.asp?state=California&abbr=CA to look up the soil series on your site and compare your observations with the official soils series description (OSD).

2. What is the health status of your site? What measures need to be taken to maintain or restore its health?

3. If a brood cow consumes 25 pounds of forage per day, how many acres are required to support 30 cows on this site for a year? How many acres for a herd of 30 sheep who consume 4.4 pounds per day?

Soil Laboratory Report 5b

Soil Report

Advanced Nutrients

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Eureka, CA 95501
707-633-8885
Monday - Saturday 9 a.m. - 6 p.m.
www.dbsanalytics.com

Analysis Type	Result	Optimal Range
pH	5.8	6 - 7
Electrical Conductivity * *EC* (dS/m)	0.27	0.5 - 2
Bulk Density (g/cm^3)	0.83	1.1-1.5
Buffer pH	6.2	

Soluble Plant Available Macronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Calcium (Ca)	38	80 - 400
Magnesium (Mg)	9	30-70
Potassium (K)	14	60-200
Sodium (Na)	7	0 - 80
Nitrate (NO_3^--N)	5	70 - 200
Phosphate (PO_4^{3-}-P)	ND	15 - 25

Micronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Zinc (Zn)	1	14 - 30
Manganese (Mn)	7	8 - 30
Copper (Cu)	3	2 - 30
Iron (Fe)	501	25 - 50
Boron (B)	1.3	0.5 - 2.5
Chloride (Cl^-)	38	<45

Total Plant Available Macronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Calcium (Ca)	2850	2000-4000
Magnesium (Mg)	373	100-500
Potassium (K)	125	150-800
Sodium (Na)	14	See ESP
Nitrate (NO_3^--N) ppm	1	
Phosphate (PO43--P) ppm	9	

Calculated Percent Exchangeable Cations

How Calcium, Magnesium, Sodium, and Potassium relate to each other. These will add up to 100%. By increasing one, others will decrease. If the percentages differ greatly from the given optimal ranges see comments for further instruction.

Analyte Type in Percent	Result	Optimal Range (%)
Calcium (Ca)	57	45
Magnesium (Mg)	13	9
Potassium (K)	20	38
Sodium (Na)	10	<5

Calculated Calcium to Magnesium Ratio

Analyte Type	Result	Optimal Ratio
Ca:Mg	2.7	>3

Calculated Salinity & Lime Requirement

Analysis Type	Result	Optimal Range
SAR (sodium absorption ratio)	0.1	<13
ESP (exchangeable sodium percent)	1	<15%
Lime Req* lbs/acre		100% Calcium Carbonate to raise pH

Organic Matter Panel

Analyte Type in ppm	Result	Optimal Range
Estimated Nitrogen Release *ENR* (lb/acre)	224	80-150
Organic Matter (%)	9	3-5
Organic Carbon (%)	5	8 - 20

*Lime Requirement is reported as 100% $CaCO_3$ to a pH of 6.5 - Compare to the % $CaCO_3$ in your liming product to determine application rate.

ND - No Detection - This means there was not a detected amount of this substance in your sample.

Customer Contact:

Name: Sam Polly - SHN
Phone: 707-822-5785
Email: spolly@shn-engr.com
Date Received: 05/09/2019
Report date: 05/15/2019
Report Approved by: EJ QC Approved by: LS

Sample Info:

Received by: NHS
Sample Name: MP1
Lab ID: 8900 ntpa1

Results at a Glance:

See Page 2 for complete Interpretations & Recommendations

- Acceptable EC
- Low Bulk Density
- Very Low Calcium
- Very Low Magnesium
- Very Low Potassium
- Very Low Nitrate
- Very Low Phosphate
- Very Low Zn
- Low Manganese
- Very High Iron
- High Chloride
- Low TPA Potassium
- Low TPA Nitrate
- Low TPA Phosphate
- Low Ca:Mg Ratio
- Acceptable SAR
- Acceptable ESP
- High Organic Matter

Nutrient Recommendations in lbs/1000Ft^2

Ca	Mg	K_2O	NO_3^-	P_2O_5

Amendment Application Rates lb/1000Ft^2

Gypsum	Epsom Salt	Sulfate of Potash	Micronized Oyster Shell

Physical Characteristics (USDA Texture by Feel)

%Clay	%Sand	%Silt	Texture Designation

The reported lime application rate is intended to raise pH to 6.5, HOWEVER a soil can only process 5lb/100 sq-ft (10lb/100 cubic-ft) of liming agent per application. Applications that are larger than 5lb/100Ft2 should be split with one half applied now and the half at the end of the season before planting a cover crop.

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Soil Report

Advanced Nutrients

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707-633-8885
Monday - Saturday 9 a.m. - 6 p.m.
www.dbsanalytics.com

Analysis Type	Result	Optimal Range
pH	5.0	6 - 7
Electrical Conductivity * *EC* (dS/m)	0.17	0.5 - 2
Bulk Density (g/cm^3)	0.87	1.1-1.5
Buffer pH	5.4	

Soluble Plant Available Macronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Calcium (Ca)	5	80 - 400
Magnesium (Mg)	3	30-70
Potassium (K)	2	60-200
Sodium (Na)	16	0 - 80
Nitrate (NO_3^--N)	ND	70 - 200
Phosphate (PO_4^{3-}-P)	ND	15 - 25

Micronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Zinc (Zn)	1	14 - 30
Manganese (Mn)	13	8 - 30
Copper (Cu)	1	2 - 30
Iron (Fe)	802	25 - 50
Boron (B)	0.9	0.5 - 2.5
Chloride (Cl^-)	23	<45

Total Plant Available Macronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Calcium (Ca)	319	2000-4000
Magnesium (Mg)	212	100-500
Potassium (K)	57	150-800
Sodium (Na)	60	See ESP
Nitrate (NO_3^--N) ppm	1	
Phosphate (PO43--P) ppm	ND	

Calculated Percent Exchangeable Cations

How Calcium, Magnesium, Sodium, and Potassium relate to each other. These will add up to 100%. By increasing one, others will decrease. If the percentages differ greatly from the given optimal ranges see comments for further instruction.

Analyte Type in Percent	Result	Optimal Range (%)
Calcium (Ca)	20	45
Magnesium (Mg)	10	9
Potassium (K)	9	38
Sodium (Na)	61	<5

Calculated Calcium to Magnesium Ratio

Analyte Type	Result	Optimal Ratio
Ca:Mg	1.2	>3

Calculated Salinity & Lime Requirement

Analysis Type	Result	Optimal Range
SAR (sodium absorption ratio)	0.9	<13
ESP (exchangeable sodium percent)	12	<15%
Lime Req* lbs/acre		100% Calcium Carbonate to raise pH

Organic Matter Panel

Analyte Type in ppm	Result	Optimal Range
Estimated Nitrogen Release *ENR* (lb/acre)	243	80-150
Organic Matter (%)	10	3-5
Organic Carbon (%)	6	8 - 20

*Lime Requirement is reported as 100% $CaCO_3$ to a pH of 6.5 - Compare to the % $CaCO_3$ in your liming product to determine application rate.

ND - No Detection - This means there was not a detected amount of this substance in your sample.

Customer Contact:	
Name: Sam Polly - SHN	
Phone: 707-822-5785	
Email: spolly@shn-engr.com	
Date Received: 05/09/2019	
Report date: 05/15/2019	
Report Approved by: EJ	QC Approved by: LS

Sample Info:

Received by: NHS

Sample Name: W55

Lab ID: 8903 ntpa1

Results at a Glance:

See Page 2 for complete Interpretations & Recommendations

- Very Low pH
- Low EC
- Low Bulk Density
- Very Low Calcium
- Very Low Magnesium
- Very Low Potassium
- Very Low Nitrate
- Very Low Phosphate
- Very Low Zn
- Low Copper
- Very High Iron
- High Chloride
- Low TPA Calcium
- Low TPA Potassium
- Low TPA Nitrate
- Low TPA Phosphate
- Low Ca:Mg Ratio
- Acceptable SAR
- High ESP
- High Organic Matter

Nutrient Recommendations in lbs/1000Ft^2				
Ca	Mg	K_2O	NO_3^-	P_2O_5

Amendment Application Rates lb/1000Ft^2			
Gypsum	Epsom Salt	Sulfate of Potash	Micronized Oyster Shell

Physical Characteristics (USDA Texture by Feel)			
%Clay	%Sand	%Silt	Texture Designation

The reported lime application rate is intended to raise pH to 6.5, HOWEVER a soil can only process 5lb/100 sq-ft (10lb/100 cubic-ft) of liming agent per application. Applications that are larger than 5lb/100Ft2 should be split with one half applied now and the half at the end of the season before planting a cover crop.

For further details about your report give us a call to discuss a consultation. You can also check out our website at www.dbsanalytics.com for more information, helpful hints and disclaimers.

Interpretations & Recommendations:	
Very Low pH	Amend with oyster shell, dolomite, or calcitic limestone to raise into optimal range to avoid nutrient lockout as well as toxicity of micronutrients. Adding compost and worm castings will assist in optimizing pH. If you need a lime application rate developed for your soil, please contact us.
Low EC	Low EC values are indicative of a nutrient deficient soil. Adding amendments or fertilizers will increase the soil EC.
Low Bulk Density	Soils with a low bulk density are most often associated with high amounts of organic matter. Native soils with a low bulk density do not usually cause issues with growing practices.
Very Low Calcium	Soils with low calcium are very likely to exhibit visual calcium deficiencies. Lack of calcium can affect tissue growth and also cause conditions that allow the plant to be more susceptible to fungal pathogens. Increase calcium content using lime or oyster shell only if the soil pH is lower than ideal. If the pH is within range, use gypsum to add calcium. If plants are actively growing, use a liquid source of calcium and if visual deficiencies are present, use a foliar calcium supplement as well.
Very Low Magnesium	Plants growing in soils with very low magnesium levels are likely to show visual deficiency symptoms. Plants can take 4-6 weeks to show distinct signs of magnesium deficiency, it is recommended to add a magnesium amendment immediately. Common amendments are magnesium sulfate (Epsom salt) or if also lacking potassium, Sul-Po-Mag can be used. If growing in potting media use a liquid magnesium fertilizer and consider foliarly applying magnesium as well.
Very Low Potassium	Very low potassium levels will significantly decrease plant yields. Visual deficiency symptoms are very likely at this level. In addition, low potassium levels are related to increases in pest and diease issues. Low potassium levels also decrease the plants ability to resist changes in soil moisture (i.e. drought) and air temperature extremes. Low levels of potassium are very common at the end of fall. The lack of potassium should be addressed now and rechecked prior to the start of the next cultivation cycle. Foliar applications of compost tea will also help supress pest and disease caused by low potassium levels.
Very Low Nitrate	If your plants are in currently in veg, you need to supply more nitrogen. Plant growth is highly dependent on nitrogen, and there will not be enough for proper growth. Depending on where your crop is in its growth cycle, nitrate may become too low, as it is needed at low levels into flower. You may need to boost N in late flower, but this can be easily mitigated with light feedings of fish hyrolysate or similarly balanced product. Low levels of nitrate are very common at the end of fall. This should be addressed prior to the start of the next cultivation cycle, but is not an issue if you are not actively growing over the rainy season.
Very Low Phosphate	This soil test has a very minimal amount of phosphorus. A soluble form of phosphorus should be applied immediately to increase P-levels in the near-term and an amendment containing phosphorus (guano, bone meal, or other P-heavy source) should be applied near the root zone to supply P throughout the growing season. Healthy soil biology will also assist in increasing phosphorus availibility.
Very Low Zn	Soil with less than 5 ppm zinc should have a zinc source applied to the soil before the growing season or are likely to exhibit zinc deficiencies. Plants with visual deficiency symptoms should have a foliar application of chelated zinc applied and also a zinc source (glacial rock dust or basalt) should be applied to the soil.
Low Copper	Copper can be supplied by most composts, manures, and trace mineral additives (glacial rock dust). If copper deficiency symptoms are present apply a micronutrient blend foliarly.
Very High Iron	Iron uptake increases as pH lowers, so iron toxicities can be an issue in systems with pH below 6.0. High levels of iron may induce deficiencies of copper, zinc, manganese, and molybdenum. High levels of iron, especially at lower pH, can decrease phosphorus availability.
High Chloride	Consider a flush to reduce this level if chloride impacts are evident, otherwise regular watering should reduce these levels adequately. Chloride is a mobile nutrient and will readily leach from the soil. Moving forward, be aware that marine-based amendments, manures, and manure composts likely contain chloride. Inorganic liquid fertilizers often contain chloride compounds (i.e. potassium chloride) and are often the source of high chloride levels. Check irrigation water for chloride before flushing if you have not added other chloride sources.
Low TPA Calcium	Increase calcium content using lime or oyster shell only if the soil pH is lower than ideal. Soils within optimal pH range typically do not have issues with calcium deficiencies. If the pH is within range, use gypsum to add calcium. If plants are actively growing, use a liquid source of calcium and if visual deficiencies are present, use a foliar calcium supplement as well.
Low TPA Potassium	Soils with low total plant available potassium suggests that the soil does not have much potassium in reserve. Additions of compost or other quality organic matter will help improve potassium levels. Application of some rock minerals (glacial rock dust, basalt, or similar) can also help improve potassium in the soil.
Low TPA Nitrate	The amount of nitrogen released from the soil varies based on: soil health, soil texture, temperature and moisture content. Typically only 1-4% of the total plant available nitrogen will become available during the growing season.
Low TPA Phosphate	This soil test has a very minimal amount of phosphorus. A soluble form of phosphorus should be applied immediately to increase P-levels in the near-term and an amendment containing phosphorus (guano, bone meal, or other P-heavy source) should be applied near the root zone to supply P throughout the growing season. Healthy soil biology will also assist in increasing phosphorus availability.
Low Ca:Mg Ratio	There is not enough calcium in the soil when compared to magnesium levels. If soil pH is low, calcium concentrations can be increased using lime or oyster shell, but avoid using dolomite (contains magnesium). If pH is acceptable, gypsum can be added to supply calcium without changing pH.
Acceptable SAR	Sodium adsorption levels <10, typically do not cause issues with plant growth unless the soil pH is excessively high and/or the soil EC is excessively high.
High ESP	Exchangeable sodium percentages between 10-15 are cause for concern. Inherent soil properties may be the cause, but are often due to poor quality irrigation water or irrigation practices. If using amendments containing sodium, they should be discontinued. If you are not using any amendments containing sodium, the irrigation water quality should be checked.
High Organic Matter	Soil with high amounts of organic matter can create issues, but are usually not cause for concern. Be aware that a small percentage nitrogen, phosphorus, and other plant essential elements will become soluble over the coarse of the growing season.

Soil Report
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Analysis Type	Result	Optimal Range
pH	5.1	6 - 7
Electrical Conductivity * *EC* (dS/m)	0.10	0.5 - 2
Bulk Density (g/cm^3)	1.12	1.1-1.5
Buffer pH	5.9	

Soluble Plant Available Macronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Calcium (Ca)	3	80 - 400
Magnesium (Mg)	1	30-70
Potassium (K)	1	60-200
Sodium (Na)	7	0 - 80
Nitrate (NO_3^--N)	ND	70 - 200
Phosphate (PO_4^{3-}-P)	ND	15 - 25

Micronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Zinc (Zn)	ND	14 - 30
Manganese (Mn)	4	8 - 30
Copper (Cu)	ND	2 - 30
Iron (Fe)	12	25 - 50
Boron (B)	0.3	0.5 - 2.5
Chloride (Cl^-)	12	<45

Total Plant Available Macronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Calcium (Ca)	387	2000-4000
Magnesium (Mg)	320	100-500
Potassium (K)	62	150-800
Sodium (Na)	28	See ESP
Nitrate (NO_3^--N) ppm	1	
Phosphate (PO43--P) ppm	ND	

Calculated Percent Exchangeable Cations

How Calcium, Magnesium, Sodium, and Potassium relate to each other. These will add up to 100%. By increasing one, others will decrease. If the percentages differ greatly from the given optimal ranges see comments for further instruction.

Analyte Type in Percent	Result	Optimal Range (%)
Calcium (Ca)	23	45
Magnesium (Mg)	8	9
Potassium (K)	10	38
Sodium (Na)	60	<5

Calculated Calcium to Magnesium Ratio

Analyte Type	Result	Optimal Ratio
Ca:Mg	1.7	>3

Calculated Salinity & Lime Requirement

Analysis Type	Result	Optimal Range
SAR (sodium absorption ratio)	0.4	<13
ESP (exchangeable sodium percent)	5	<15%
Lime Req* lbs/acre		100% Calcium Carbonate to raise pH

Organic Matter Panel

Analyte Type in ppm	Result	Optimal Range
Estimated Nitrogen Release *ENR* (lb/acre)	83	80-150
Organic Matter (%)	2	3-5
Organic Carbon (%)	1	8 - 20

*Lime Requirement is reported as 100% $CaCO_3$ to a pH of 6.5 - Compare to the % $CaCO_3$ in your liming product to determine application rate.

ND - No Detection - This means there was not a detected amount of this substance in your sample.

Customer Contact:
Name: Sam Polly - SHN
Phone: 707-822-5785
Email: spolly@shn-engr.com
Date Received: 05/09/2019
Report date:
Report Approved by: LTC QC Approved by: EJ

Sample Info:
Received by: NHS
Sample Name: MP5
Lab ID: 8902 ntpa1

Results at a Glance:

See Page 2 for complete Interpretations & Recommendations

- Very Low pH
- Low EC
- Medium Bulk Density
- Very Low Calcium
- Very Low Magnesium
- Very Low Potassium
- Very Low Nitrate
- Very Low Phosphate
- Very Low Zn
- Low Manganese
- Low Copper
- Low Iron
- Low Boron
- Low TPA Calcium
- Low TPA Potassium
- Low TPA Nitrate
- Low TPA Phosphate
- Low Ca:Mg Ratio
- Acceptable SAR
- Acceptable ESP
- Low Organic Matter

Nutrient Recommendations in lbs/1000Ft^2				
Ca	Mg	K_2O	NO_3^-	P_2O_5

Amendment Application Rates lb/1000Ft^2			
Gypsum	Epsom Salt	Sulfate of Potash	Micronized Oyster Shell

Physical Characteristics (USDA Texture by Feel)			
%Clay	%Sand	%Silt	Texture Designation

The reported lime application rate is intended to raise pH to 6.5, HOWEVER a soil can only process 5lb/100 sq-ft (10lb/100 cubic-ft) of liming agent per application. Applications that are larger than 5lb/100Ft2 should be split with one half applied now and the half at the end of the season before planting a cover crop.

For further details about your report give us a call to discuss a consultation. You can also check out our website at www.dbsanalytics.com for more information, helpful hints and disclaimers.

Interpretations & Recommendations:	
Very Low pH	Amend with oyster shell, dolomite, or calcitic limestone to raise into optimal range to avoid nutrient lockout as well as toxicity of micronutrients. Adding compost and worm castings will assist in optimizing pH. If you need a lime application rate developed for your soil, please contact us.
Low EC	Low EC values are indicative of a nutrient deficient soil. Adding amendments or fertilizers will increase the soil EC.
Medium Bulk Density	Most native topsoil is within this range. Soils nearing the the high end of the range may have less than ideal drainage. Adding organic matter, such as compost, earthworm casts, and biochar, are the easier way to decrease bulk density. Avoid heavy equipment on the soil whenever possible, especially during wet conditions.
Very Low Calcium	Soils with low calcium are very likely to exhibit visual calcium deficiencies. Lack of calcium can affect tissue growth and also cause conditions that allow the plant to be more susceptible to fungal pathogens. Increase calcium content using lime or oyster shell only if the soil pH is lower than ideal. If the pH is within range, use gypsum to add calcium. If plants are actively growing, use a liquid source of calcium and if visual deficiencies are present, use a foliar calcium supplement as well.
Very Low Magnesium	Plants growing in soils with very low magnesium levels are likely to show visual deficiency symptoms. Plants can take 4-6 weeks to show distinct signs of magnesium deficiency, it is recommended to add a magnesium amendment immediately. Common amendments are magnesium sulfate (Epsom salt) or if also lacking potassium, Sul-Po-Mag can be used. If growing in potting media use a liquid magnesium fertilizer and consider foliarly applying magnesium as well.
Very Low Potassium	Very low potassium levels will significantly decrease plant yields. Visual deficiency symptoms are very likely at this level. In addition, low potassium levels are related to increases in pest and diease issues. Low potassium levels also decrease the plants ability to resist changes in soil moisture (i.e. drought) and air temperature extremes. Low levels of potassium are very common at the end of fall. The lack of potassium should be addressed now and rechecked prior to the start of the next cultivation cycle. Foliar applications of compost tea will also help supress pest and disease caused by low potassium levels.
Very Low Nitrate	If your plants are in currently in veg, you need to supply more nitrogen. Plant growth is highly dependent on nitrogen, and there will not be enough for proper growth. Depending on where your crop is in its growth cycle, nitrate may become too low, as it is needed at low levels into flower. You may need to boost N in late flower, but this can be easily mitigated with light feedings of fish hyrolysate or similarly balanced product. Low levels of nitrate are very common at the end of fall. This should be addressed prior to the start of the next cultivation cycle, but is not an issue if you are not actively growing over the rainy season.
Very Low Phosphate	This soil test has a very minimal amount of phosphorus. A soluble form of phosphorus should be applied immediately to increase P-levels in the near-term and an amendment containing phosphorus (guano, bone meal, or other P-heavy source) should be applied near the root zone to supply P throughout the growing season. Healthy soil biology will also assist in increasing phosphorus availibility.
Very Low Zn	Soil with less than 5 ppm zinc should have a zinc source applied to the soil before the growing season or are likely to exhibit zinc deficiencies. Plants with visual deficiency symptoms should have a foliar application of chelated zinc applied and also a zinc source (glacial rock dust or basalt) should be applied to the soil.
Low Manganese	Deficiencies symptoms are likely at this range. Use a trace mineral additive (rock dust) if levels are low prior to planting or apply a readily available micronutrient product during production to raise plant available micronutrient level to correct visible deficiencies.
Low Copper	Copper can be supplied by most composts, manures, and trace mineral additives (glacial rock dust). If copper deficiency symptoms are present apply a micronutrient blend foliarly.
Low Iron	Soils with low levels of iron can be corrected by adding a slow release iron source or compost. Compost teas can also increase iron levels and increase availability. Foliar application of zinc may be necessary if deficiency symptoms are present.
Low Boron	The boron level is low in this soil. Unless levels are increase, it is possible for boron deficiency to occur. Most trace mineral additives (glacial rock dust), liquid micronutrient products, and composts contain boron. If deficiency symptoms are present, apply boron foliarly.
Low TPA Calcium	Increase calcium content using lime or oyster shell only if the soil pH is lower than ideal. Soils within optimal pH range typically do not have issues with calcium deficiencies. If the pH is within range, use gypsum to add calcium. If plants are actively growing, use a liquid source of calcium and if visual deficiencies are present, use a foliar calcium supplement as well.
Low TPA Potassium	Soils with low total plant available potassium suggests that the soil does not have much potassium in reserve. Additions of compost or other quality organic matter will help improve potassium levels. Application of some rock minerals (glacial rock dust, basalt, or similar) can also help improve potassium in the soil.
Low TPA Nitrate	The amount of nitrogen released from the soil varies based on: soil health, soil texture, temperature and moisture content. Typically only 1-4% of the total plant available nitrogen will become available during the growing season.
Low TPA Phosphate	This soil test has a very minimal amount of phosphorus. A soluble form of phosphorus should be applied immediately to increase P-levels in the near-term and an amendment containing phosphorus (guano, bone meal, or other P-heavy source) should be applied near the root zone to supply P throughout the growing season. Healthy soil biology will also assist in increasing phosphorus availability.
Low Ca:Mg Ratio	There is not enough calcium in the soil when compared to magnesium levels. If soil pH is low, calcium concentrations can be increased using lime or oyster shell, but avoid using dolomite (contains magnesium). If pH is acceptable, gypsum can be added to supply calcium without changing pH.
Acceptable SAR	Sodium adsorption levels <10, typically do not cause issues with plant growth unless the soil pH is excessively high and/or the soil EC is excessively high.
Acceptable ESP	Exchangeable sodium percentages <10, typically do not cause issues with plant growth.
Low Organic Matter	Soils with low organic matter will be more productive with organic matter additions. Additions of quality composts, manures, biochar, and earthworm castings will help increase soil organic matter.

Soil Report
Advanced Nutrients

Dirty Business Soil Consulting & Analysis
852 W Wabash Ave
Eureka, CA 95501
707-633-8885
Monday - Saturday 9 a.m. - 6 p.m.
www.dbsanalytics.com

Customer Contact:	
Name: Sam Polly - SHN	
Phone: 707-822-5785	
Email: spolly@shn-engr.com	
Date Received: 05/09/2019	
Report date: 05/15/2019	
Report Approved by: EJ	QC Approved by: LS

Sample Info:
Received by: NHS
Sample Name: MP2
Lab ID: 8901 ntpa1

Analysis Type	Result	Optimal Range
pH	5.7	6 - 7
Electrical Conductivity * *EC* (dS/m)	0.30	0.5 - 2
Bulk Density (g/cm^3)	0.91	1.1-1.5
Buffer pH	5.9	

Soluble Plant Available Macronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Calcium (Ca)	23	80 - 400
Magnesium (Mg)	8	30-70
Potassium (K)	10	60-200
Sodium (Na)	17	0 - 80
Nitrate (NO_3^--N)	2	70 - 200
Phosphate (PO_4^{3-}-P)	ND	15 - 25

Micronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Zinc (Zn)	1	14 - 30
Manganese (Mn)	116	8 - 30
Copper (Cu)	5	2 - 30
Iron (Fe)	539	25 - 50
Boron (B)	2.6	0.5 - 2.5
Chloride (Cl^-)	43	<45

Total Plant Available Macronutrients

Analyte Type in ppm	Result	Optimal Range (ppm)
Calcium (Ca)	1645	2000-4000
Magnesium (Mg)	341	100-500
Potassium (K)	169	150-800
Sodium (Na)	49	See ESP
Nitrate (NO_3^--N) ppm	1	
Phosphate (PO43--P) ppm	8	

Calculated Percent Exchangeable Cations

How Calcium, Magnesium, Sodium, and Potassium relate to each other. These will add up to 100%. By increasing one, others will decrease. If the percentages differ greatly from the given optimal ranges see comments for further instruction.

Analyte Type in Percent	Result	Optimal Range (%)
Calcium (Ca)	40	45
Magnesium (Mg)	13	9
Potassium (K)	17	38
Sodium (Na)	30	<5

Calculated Calcium to Magnesium Ratio

Analyte Type	Result	Optimal Ratio
Ca:Mg	1.8	>3

Calculated Salinity & Lime Requirement

Analysis Type	Result	Optimal Range
SAR (sodium absorption ratio)	0.4	<13
ESP (exchangeable sodium percent)	6	<15%
Lime Req* lbs/acre		100% Calcium Carbonate to raise pH

Organic Matter Panel

Analyte Type in ppm	Result	Optimal Range
Estimated Nitrogen Release *ENR* (lb/acre)	263	80-150
Organic Matter (%)	11	3-5
Organic Carbon (%)	7	8 - 20

*Lime Requirement is reported as 100% $CaCO_3$ to a pH of 6.5 - Compare to the % $CaCO_3$ in your liming product to determine application rate.

ND - No Detection - This means there was not a detected amount of this substance in your sample.

Results at a Glance:

See Page 2 for complete Interpretations & Recommendations

- Acceptable EC
- Low Bulk Density
- Very Low Calcium
- Very Low Magnesium
- Very Low Potassium
- Very Low Nitrate
- Very Low Phosphate
- Very Low Zn
- Very High Manganese
- Very High Iron
- High Boron
- High Chloride
- Low TPA Calcium
- Medium TPA Potassium
- Low TPA Nitrate
- Low TPA Phosphate
- Low Ca:Mg Ratio
- Acceptable SAR
- Acceptable ESP
- High Organic Matter

Nutrient Recommendations in lbs/1000Ft^2				
Ca	Mg	K_2O	NO_3^-	P_2O_5

Amendment Application Rates lb/1000Ft^2			
Gypsum	Epsom Salt	Sulfate of Potash	Micronized Oyster Shell

Physical Characteristics (USDA Texture by Feel)			
%Clay	%Sand	%Silt	Texture Designation

The reported lime application rate is intended to raise pH to 6.5, HOWEVER a soil can only process 5lb/100 sq-ft (10lb/100 cubic-ft) of liming agent per application. Applications that are larger than 5lb/100Ft2 should be split with one half applied now and the half at the end of the season before planting a cover crop.

For further details about your report give us a call to discuss a consultation. You can also check out our website at www.dbsanalytics.com for more information, helpful hints and disclaimers.

Interpretations & Recommendations:	
Acceptable EC	Will increase when you amend. A low EC is indicative of nutrient deficient soil.
Low Bulk Density	Soils with a low bulk density are most often associated with high amounts of organic matter. Native soils with a low bulk density do not usually cause issues with growing practices.
Very Low Calcium	Soils with low calcium are very likely to exhibit visual calcium deficiencies. Lack of calcium can affect tissue growth and also cause conditions that allow the plant to be more susceptible to fungal pathogens. Increase calcium content using lime or oyster shell only if the soil pH is lower than ideal. If the pH is within range, use gypsum to add calcium. If plants are actively growing, use a liquid source of calcium and if visual deficiencies are present, use a foliar calcium supplement as well.
Very Low Magnesium	Plants growing in soils with very low magnesium levels are likely to show visual deficiency symptoms. Plants can take 4-6 weeks to show distinct signs of magnesium deficiency, it is recommended to add a magnesium amendment immediately. Common amendments are magnesium sulfate (Epsom salt) or if also lacking potassium, Sul-Po-Mag can be used. If growing in potting media use a liquid magnesium fertilizer and consider foliarly applying magnesium as well.
Very Low Potassium	Very low potassium levels will significantly decrease plant yields. Visual deficiency symptoms are very likely at this level. In addition, low potassium levels are related to increases in pest and diease issues. Low potassium levels also decrease the plants ability to resist changes in soil moisture (i.e. drought) and air temperature extremes. Low levels of potassium are very common at the end of fall. The lack of potassium should be addressed now and rechecked prior to the start of the next cultivation cycle. Foliar applications of compost tea will also help supress pest and disease caused by low potassium levels.
Very Low Nitrate	If your plants are in currently in veg, you need to supply more nitrogen. Plant growth is highly dependent on nitrogen, and there will not be enough for proper growth. Depending on where your crop is in its growth cycle, nitrate may become too low, as it is needed at low levels into flower. You may need to boost N in late flower, but this can be easily mitigated with light feedings of fish hyrolysate or similarly balanced product. Low levels of nitrate are very common at the end of fall. This should be addressed prior to the start of the next cultivation cycle, but is not an issue if you are not actively growing over the rainy season.
Very Low Phosphate	This soil test has a very minimal amount of phosphorus. A soluble form of phosphorus should be applied immediately to increase P-levels in the near-term and an amendment containing phosphorus (guano, bone meal, or other P-heavy source) should be applied near the root zone to supply P throughout the growing season. Healthy soil biology will also assist in increasing phosphorus availibility.
Very Low Zn	Soil with less than 5 ppm zinc should have a zinc source applied to the soil before the growing season or are likely to exhibit zinc deficiencies. Plants with visual deficiency symptoms should have a foliar application of chelated zinc applied and also a zinc source (glacial rock dust or basalt) should be applied to the soil.
Very High Manganese	Very high levels are often indicative of an acidic soil, especially those below pH 5.0. Increase and optimize pH with additions of lime, compost, and worm castings. High levels of manganese are often also found in soils with excessive water or poor aeration.
Very High Iron	Iron uptake increases as pH lowers, so iron toxicities can be an issue in systems with pH below 6.0. High levels of iron may induce deficiencies of copper, zinc, manganese, and molybdenum. High levels of iron, especially at lower pH, can decrease phosphorus availability.
High Boron	Boron is higher than optimal. Do not add any amendments that contain boron. On a small scale, you can flush with warm/hot water to remove boron. Boron can occur naturally in well water. If you are not applying amendments or liquids that contain boron, it is recommended to test water source to ensure you are not applying boron with regular watering. If the soil pH is low, increase to >6.3 to decrease boron availability. Boron accumulates in the soil relatively easy; find the source of the boron to prevent possible toxicities.
High Chloride	Consider a flush to reduce this level if chloride impacts are evident, otherwise regular watering should reduce these levels adequately. Chloride is a mobile nutrient and will readily leach from the soil. Moving forward, be aware that marine-based amendments, manures, and manure composts likely contain chloride. Inorganic liquid fertilizers often contain chloride compounds (i.e. potassium chloride) and are often the source of high chloride levels. Check irrigation water for chloride before flushing if you have not added other chloride sources.
Low TPA Calcium	Increase calcium content using lime or oyster shell only if the soil pH is lower than ideal. Soils within optimal pH range typically do not have issues with calcium deficiencies. If the pH is within range, use gypsum to add calcium. If plants are actively growing, use a liquid source of calcium and if visual deficiencies are present, use a foliar calcium supplement as well.
Medium TPA Potassium	Soil with a moderate amount of total plant available potassium typically have enough potassium to supply the crop at during the early stages of growth but will likely need additional potassium during the season.
Low TPA Nitrate	The amount of nitrogen released from the soil varies based on: soil health, soil texture, temperature and moisture content. Typically only 1-4% of the total plant available nitrogen will become available during the growing season.
Low TPA Phosphate	This soil test has a very minimal amount of phosphorus. A soluble form of phosphorus should be applied immediately to increase P-levels in the near-term and an amendment containing phosphorus (guano, bone meal, or other P-heavy source) should be applied near the root zone to supply P throughout the growing season. Healthy soil biology will also assist in increasing phosphorus availability.
Low Ca:Mg Ratio	There is not enough calcium in the soil when compared to magnesium levels. If soil pH is low, calcium concentrations can be increased using lime or oyster shell, but avoid using dolomite (contains magnesium). If pH is acceptable, gypsum can be added to supply calcium without changing pH.
Acceptable SAR	Sodium adsorption levels <10, typically do not cause issues with plant growth unless the soil pH is excessively high and/or the soil EC is excessively high.
Acceptable ESP	Exchangeable sodium percentages <10, typically do not cause issues with plant growth.
High Organic Matter	Soil with high amounts of organic matter can create issues, but are usually not cause for concern. Be aware that a small percentage nitrogen, phosphorus, and other plant essential elements will become soluble over the coarse of the growing season.

Interpretations & Recommendations:	
Acceptable EC	Will increase when you amend. A low EC is indicative of nutrient deficient soil.
Low Bulk Density	Soils with a low bulk density are most often associated with high amounts of organic matter. Native soils with a low bulk density do not usually cause issues with growing practices.
Very Low Calcium	Soils with low calcium are very likely to exhibit visual calcium deficiencies. Lack of calcium can affect tissue growth and also cause conditions that allow the plant to be more susceptible to fungal pathogens. Increase calcium content using lime or oyster shell only if the soil pH is lower than ideal. If the pH is within range, use gypsum to add calcium. If plants are actively growing, use a liquid source of calcium and if visual deficiencies are present, use a foliar calcium supplement as well.
Very Low Magnesium	Plants growing in soils with very low magnesium levels are likely to show visual deficiency symptoms. Plants can take 4-6 weeks to show distinct signs of magnesium deficiency, it is recommended to add a magnesium amendment immediately. Common amendments are magnesium sulfate (Epsom salt) or if also lacking potassium, Sul-Po-Mag can be used. If growing in potting media use a liquid magnesium fertilizer and consider foliarly applying magnesium as well.
Very Low Potassium	Very low potassium levels will significantly decrease plant yields. Visual deficiency symptoms are very likely at this level. In addition, low potassium levels are related to increases in pest and diease issues. Low potassium levels also decrease the plants ability to resist changes in soil moisture (i.e. drought) and air temperature extremes. Low levels of potassium are very common at the end of fall. The lack of potassium should be addressed now and rechecked prior to the start of the next cultivation cycle. Foliar applications of compost tea will also help supress pest and disease caused by low potassium levels.
Very Low Nitrate	If your plants are in currently in veg, you need to supply more nitrogen. Plant growth is highly dependent on nitrogen, and there will not be enough for proper growth. Depending on where your crop is in its growth cycle, nitrate may become too low, as it is needed at low levels into flower. You may need to boost N in late flower, but this can be easily mitigated with light feedings of fish hyrolysate or similarly balanced product. Low levels of nitrate are very common at the end of fall. This should be addressed prior to the start of the next cultivation cycle, but is not an issue if you are not actively growing over the rainy season.
Very Low Phosphate	This soil test has a very minimal amount of phosphorus. A soluble form of phosphorus should be applied immediately to increase P-levels in the near-term and an amendment containing phosphorus (guano, bone meal, or other P-heavy source) should be applied near the root zone to supply P throughout the growing season. Healthy soil biology will also assist in increasing phosphorus availibility.
Very Low Zn	Soil with less than 5 ppm zinc should have a zinc source applied to the soil before the growing season or are likely to exhibit zinc deficiencies. Plants with visual deficiency symptoms should have a foliar application of chelated zinc applied and also a zinc source (glacial rock dust or basalt) should be applied to the soil.
Low Manganese	Deficiencies symptoms are likely at this range. Use a trace mineral additive (rock dust) if levels are low prior to planting or apply a readily available micronutrient product during production to raise plant available micronutrient level to correct visible deficiencies.
Very High Iron	Iron uptake increases as pH lowers, so iron toxicities can be an issue in systems with pH below 6.0. High levels of iron may induce deficiencies of copper, zinc, manganese, and molybdenum. High levels of iron, especially at lower pH, can decrease phosphorus availability.
High Chloride	Consider a flush to reduce this level if chloride impacts are evident, otherwise regular watering should reduce these levels adequately. Chloride is a mobile nutrient and will readily leach from the soil. Moving forward, be aware that marine-based amendments, manures, and manure composts likely contain chloride. Inorganic liquid fertilizers often contain chloride compounds (i.e. potassium chloride) and are often the source of high chloride levels. Check irrigation water for chloride before flushing if you have not added other chloride sources.
Low TPA Potassium	Soils with low total plant available potassium suggests that the soil does not have much potassium in reserve. Additions of compost or other quality organic matter will help improve potassium levels. Application of some rock minerals (glacial rock dust, basalt, or similar) can also help improve potassium in the soil.
Low TPA Nitrate	The amount of nitrogen released from the soil varies based on: soil health, soil texture, temperature and moisture content. Typically only 1-4% of the total plant available nitrogen will become available during the growing season.
Low TPA Phosphate	This soil test has a very minimal amount of phosphorus. A soluble form of phosphorus should be applied immediately to increase P-levels in the near-term and an amendment containing phosphorus (guano, bone meal, or other P-heavy source) should be applied near the root zone to supply P throughout the growing season. Healthy soil biology will also assist in increasing phosphorus availability.
Low Ca:Mg Ratio	There is not enough calcium in the soil when compared to magnesium levels. If soil pH is low, calcium concentrations can be increased using lime or oyster shell, but avoid using dolomite (contains magnesium). If pH is acceptable, gypsum can be added to supply calcium without changing pH.
Acceptable SAR	Sodium adsorption levels <10, typically do not cause issues with plant growth unless the soil pH is excessively high and/or the soil EC is excessively high.
Acceptable ESP	Exchangeable sodium percentages <10, typically do not cause issues with plant growth.
High Organic Matter	Soil with high amounts of organic matter can create issues, but are usually not cause for concern. Be aware that a small percentage nitrogen, phosphorus, and other plant essential elements will become soluble over the coarse of the growing season.

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Planting List 3

Table 1 Planting List Royal Gold Wetland Mitigation					
Latin Name	**Common Name**	**# of[1] Plants**	**Min[1] Spacing (feet)**	**Plant Size**	**Placement**
Low Elevation Wetland Planting Area (37,949 SF)					
Trees					
Salix lasiandra var. *lasiandra*	pacific willow	18	30	live stake	random
Salix lasiolepis	arroyo willow	30	30	live stake	random
Shrubs					
Spirea douglasii	Douglas spirea	109	10	4 in.^{2}/1 gallon	random
Physocarpus capitatus	ninebark	109	10	4 in./1gallon	random
Cornus sericea	red twig dogwood	109	10	1 gallon	random
Rubus spectabilis	salmon berry	109	10	1 gallon	cluster
Herbs					
Juncus effusus ssp. *pacificus*	common rush	308	5	plug	random
Juncus patens	spreading rush	340	5	plug	random
Scirpus microcarpus	panicled bulrush	350	5	plug	cluster
Cyperus eragrostis	tall flatsedge	260	5	plug	cluster
Eleocharis palustris	soft stemmed bulrush	68	1	any	cluster
Juncus phaeocephalus	brownhead rush	200	5	plug	cluster
Comarum palustre	marsh cinquefoil	19	5	any	cluster
Oenanthe sarmentosa	water parsley	100	5	any	cluster
Petasites frigidus var. palmatus	arctic sweet colt's foot	100	5	4 in.	cluster
Total Number of Plants Low Elevation Area		**2,229**			
Mid Elevation Wetland Planting Area (77,049 SF)					
Trees					
Alnus rubra	red alder	15	30	1 gallon	random and cluster
Frangula purshiana ssp. *purshiana*	cascara	10	30	1 gallon	cluster
Fraxinus latifolia	Oregon ash	13	30	1 gallon	random and cluster
Thuja plicata	western red cedar	15	30	1 gallon	random and cluster
Umbellularia californica	California bay	12	30		random and cluster
Picea sitchensis	Sitka spruce	13	30	1 gallon	random and cluster
Salix lasiandra var. *lasiandra*	pacific willow	10	30	live stake	random
Salix lasiolepis	arroyo willow	10	30	live stake	cluster
Shrubs					
Lonicera involucrata var. *ledebourii*	twinberry	365	10	1 gallon	random and cluster
Rubus ursinus	CA blackberry	140	10	4 in. or 1 gallon	random
Rubus spectabilis	salmonberry	230	10	1 gallon	random
Rubus parviflorus	thimbleberry	196	10	1 gallon	random
Philadelphus lewisii	mock orange	60	10	1 gallon	random
Cornus sericea	red twig dogwood	45	10	1 gallon	random

Table 1 Planting List Royal Gold Wetland Mitigation					
Latin Name	**Common Name**	**# of[1] Plants**	**Min[1] Spacing (feet)**	**Plant Size**	**Placement**
Physocarpus capitatus	Pacific ninebark	48	10	1 gallon	random
Oemleria cerasiformis	Oso berry	150	10	1 gallon	random
Sambucus racemosa	red elderberry	150	10	1 gallon	cluster
Herbs					
Sisyrinchium bellum	blue-eyed grass	314	5	4 in.	cluster
Petasites frigidus var. palmatus	arctic sweet colt's foot	164	5	4 in.	cluster
Juncus effuses ssp. *pacificus*	common rush	1,120	5	plug	random
Juncus patens	spreading rush	1,120	5	plug	cluster
Juncus occidentalis	western rush	300	5	plug	cluster
Cyperus eragrostis	tall flatsedge	380	5	plug	cluster
Athyrium filix-femina var. *cyclosorum*	lady fern	146	5	1 gallon	random
Total Number of Plants Mid-elevation Area		**5,026**			
Upland Buffer Planting Area (18,888 SF planted, 37,775 SF total area)					
Trees					
Picea sitchensis	Sitka spruce	16	20	1 gallon	random
Pseudotsuga menziesii	Douglas fir	14	20	1 gallon	random
Sequoia sempervirens	coast redwood	12	20	1 gallon	random
Umbellularia californica	California bay	12	20	1 gallon	random
Shrubs					
Baccharis pilularis ssp. *consanguinea*	coyote brush	30	10	1 gallon	random and cluster
Gaultheria shallon	salal	40	10	1 gallon or 4 in.	cluster
Holodiscus discolor	oceanspray	30	10	1 gallon	random
Amalanchier alnifolia	saskatoon serviceberry	30	10	1 gallon	random
Vaccinium ovatum	evergreen huckleberry	15	10	1 gallon	cluster
Morella californica	California wax-myrtle	15	10	1 gallon	random
Corylus cornuta	western hazelnut	30	10	1 gallon	random
Oemleria cerasiformis	oso berry	27	10	4 in.	cluster
Herbs					
Achillea millefolium	yarrow	10 lbs/ac	N/A	seed	broadcast
Bromus carinatus	California brome	10 lbs/ac	N/A	seed	broadcast
Deschampsia cespitosa	tufted hair grass	15 lbs/ac	N/A	seed	broadcast
Festuca rubra	red fescue	15 lbs/ac	N/A	seed	broadcast
Total Number of Plants Upland Buffer		**271**	---	---	---
Total Wetland Mitigation Plants		**7,526**	---	---	---

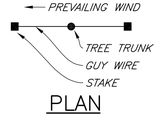
1. Spacing on center. Size substitutions acceptable, at appropriate compensation ratio, if specified size not available. Example: 4 in. can be similar size such as deep pot, tree tube, quart, etc. Per contractor discretion.
2. in..: inch

Table 2 Planting List Royal Gold Wetland Mitigation					
Latin Name	**Common Name**	**# of[1] Plants**	**Min[1] Spacing (feet)**	**Plant Size**	**Placement**
Rehabilitation Planting Area (19,166 SF)					
Trees					
Salix lasiandra var. *lasiandra*	pacific willow	14	20	live stake	random
Salix lasiolepis	arroyo willow	10	20	live stake	random
Shrubs					
Spirea douglasii	Douglas spirea	130	10	4 in. /1 gallon [3]	random
Rubus spectabilis	salmon berry	90	10	1 gallon	cluster
Herbs					
Carex obnupta	slough sedge	57	5	4 in. or 1 gallon	random
Cyperus eragrostis	tall flatsedge	135	5	plug	cluster
Eleocharis palustris	soft stemmed bulrush	50	1	any	cluster
Juncus effusus ssp. *pacificus*	common rush	205	5	plug	random
Juncus patens	spreading rush	170	5	plug	random
Juncus phaeocephalus	brownhead rush	45	5	plug	random
Petasites frigidus var. *palmatus*	arctic sweet colt's foot	29	5	any	cluster
Scirpus microcarpus	panicled bulrush	190	5	plug	cluster
Total Rehabilitation Area Plants		**1,125**	---	---	---

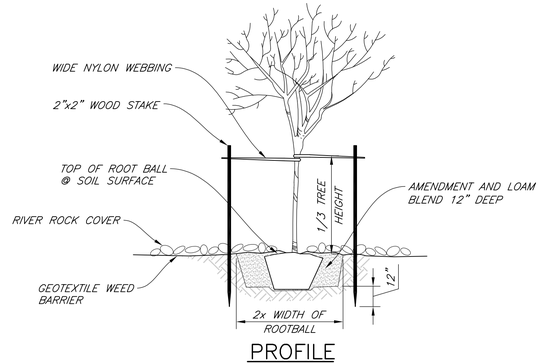
1. Spacing on center. Size substitutions acceptable, at appropriate compensation ratio, if specified size not available. Example: 4 in. can be similar size such as deep pot, tree tube, quart, etc. Per contractor/proponent discretion.
2. in.: inch

Planting Details

4



PLAN

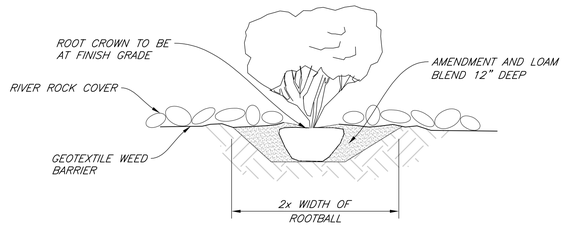


PROFILE

DETAIL 1

NTS C-11, 12

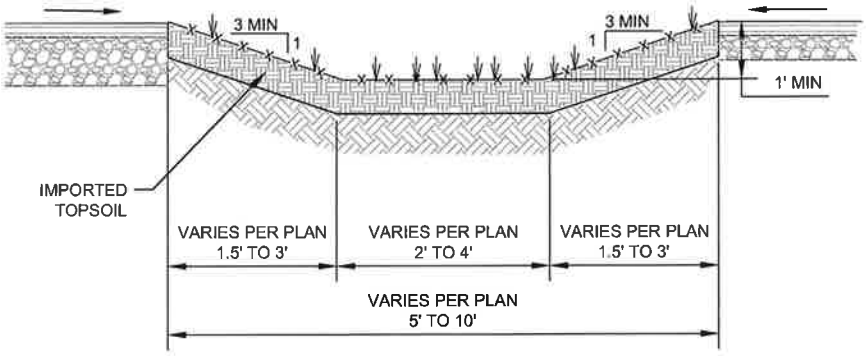
(TREE PLANTING)



DETAIL 2

NTS C-11, 12

(SHRUB PLANTING)

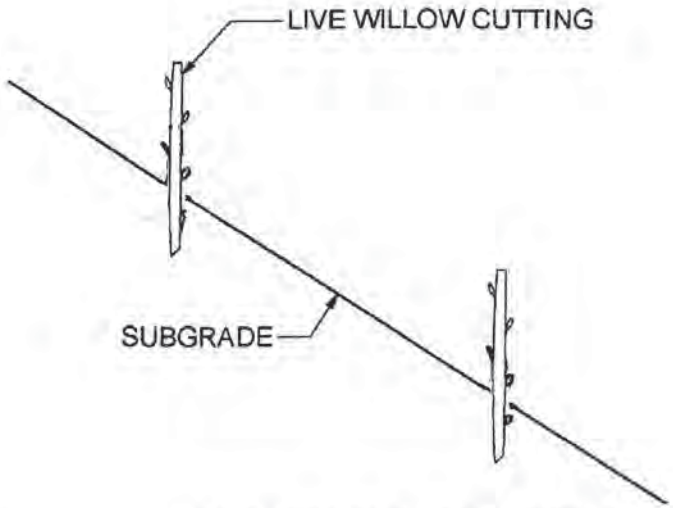


42
C504

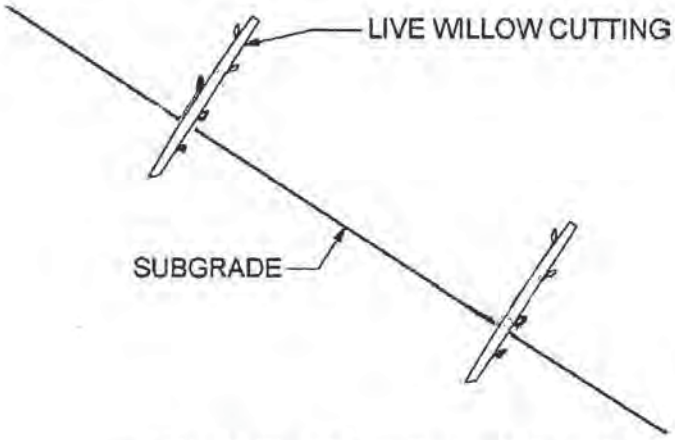
TYPICAL VEGETATIVE SWALE

SCALE: NTS

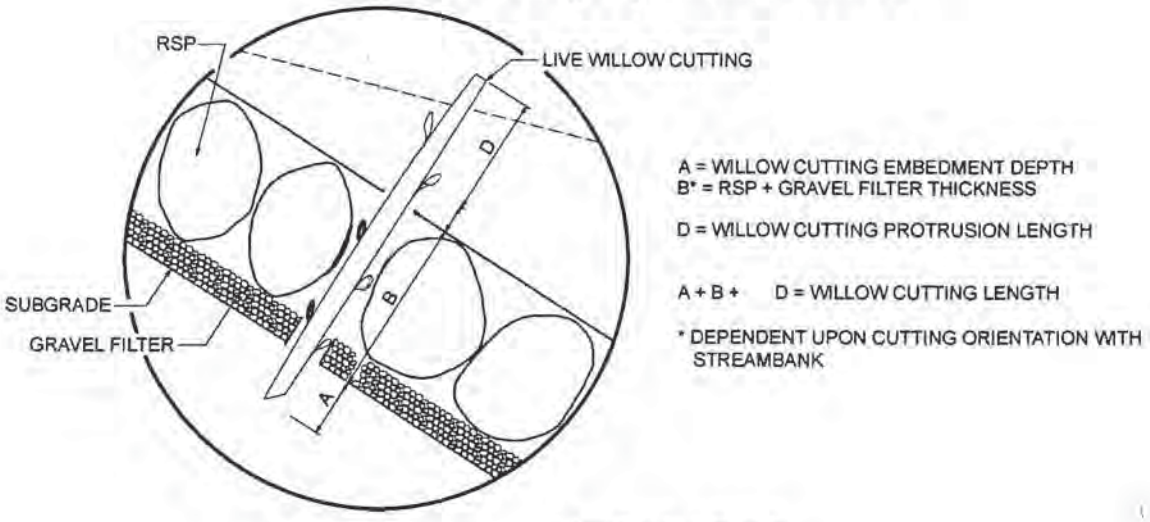
Figure 3: Sprig Placement



- Live Cutting Vertical Orientation

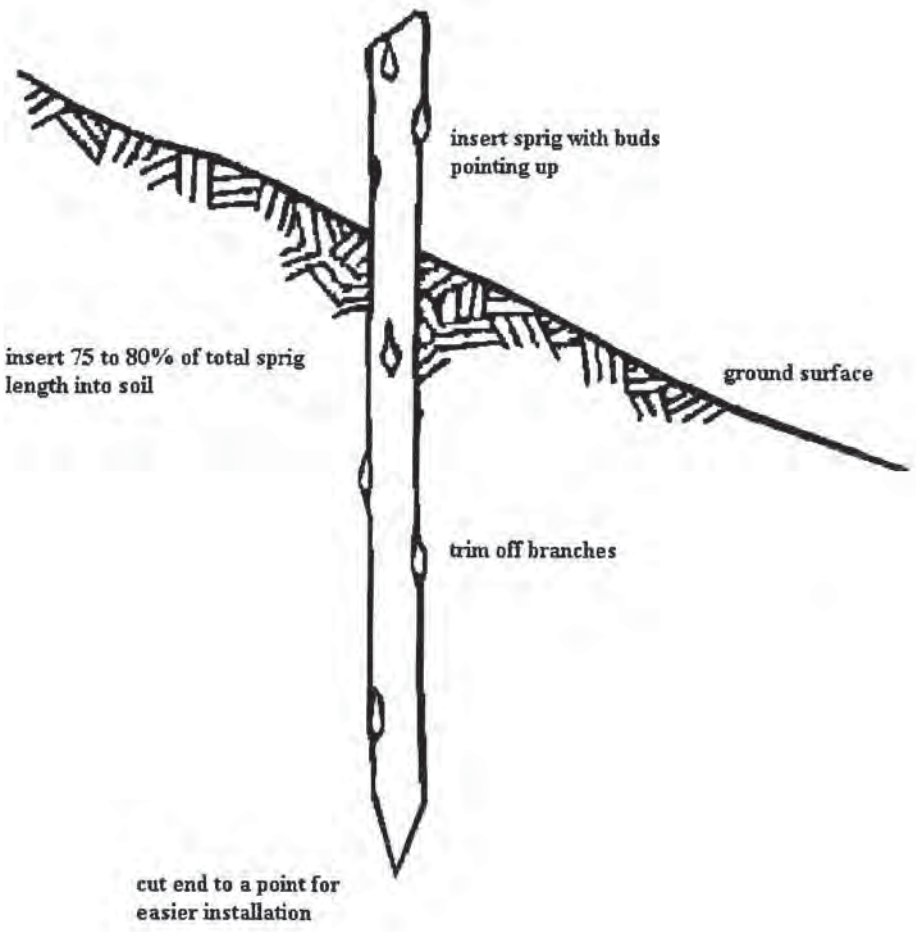


- Live Cutting Perpendicular Orientation



- Live Cutting Detail

Figure 2: Sprig Installation



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Site Photographs

4

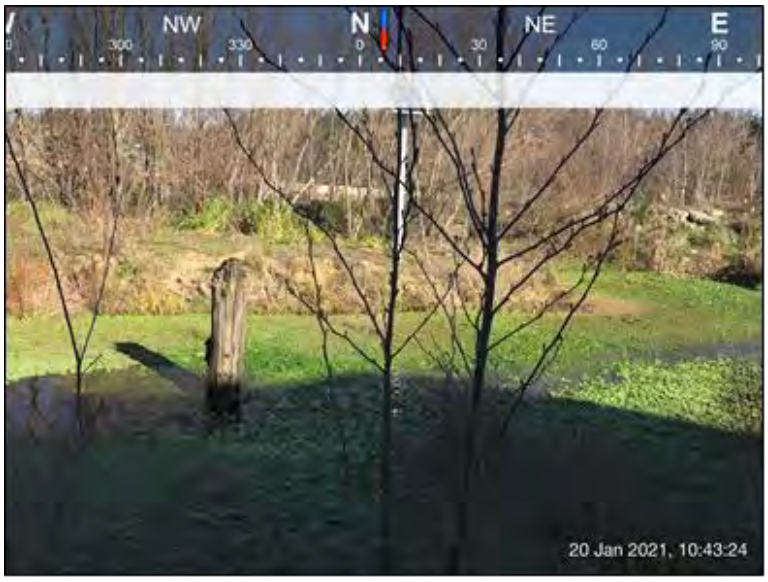

Photo 1. Stormwater detention basin in center of facility.

Photo 2. Stormwater overflow conveyance feature in center of facility.

Photo 3. Stormwater detention basin in center of facility

Photo 4. Stormwater conveyance feature in SW corner of facility.

Photo 5. Stormwater conveyance channel along SW boundary.

Photo 6. Red alder in central eastern wetland area.

Photo 7. Temporary pool in the northern portion of the study area.

Photo 8. Northwest portion of study area and wetland mitigation site.

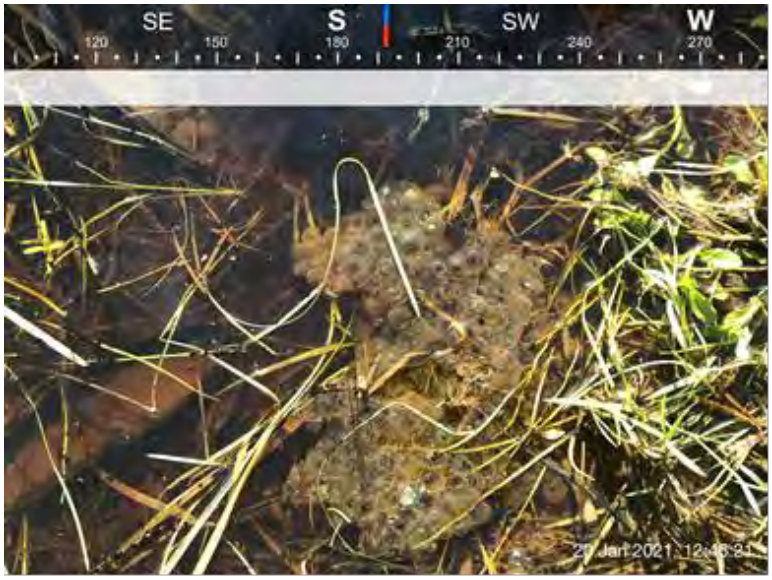

Photo 9. Northern red-legged frog egg mass in northern portion of the study area.

Photo 10. Pacific treefrog egg masses in northeastern portion of the study area.

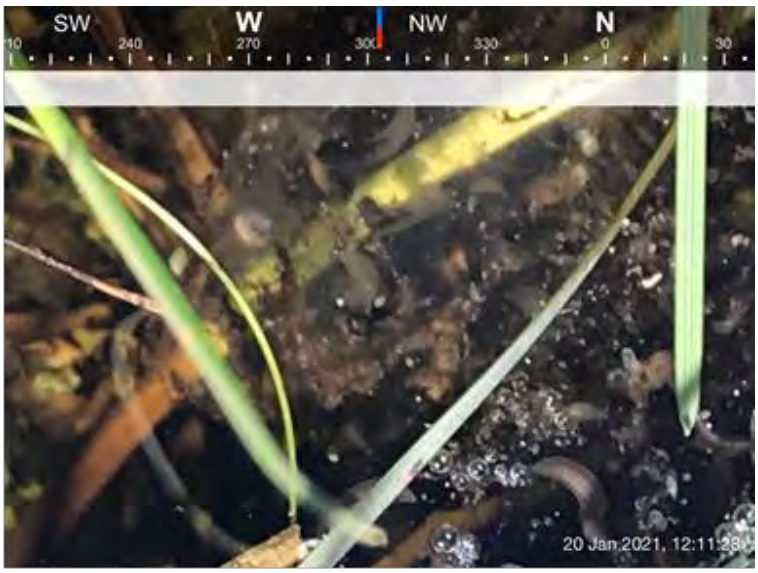

Photo 11. Rough-skinned newt larvae in northeastern portion of the study area.

Photo 12. Portion of established trail used by wildlife including elk.

SWPPP BMP Location Map

5

EXPLANATION

- DISCHARGE LOCATION
- BIO GABIONS
- VEGETATED GRAVEL BERM
- STORMWATER CONVEYANCE
- DRAINAGE FLOW PATH
- BIOSWALE
- CURB
- CHECK DAM
- FILTREXX SOXX
- FIBER ROLL
- SILT FENCE
- GRAVEL BERM
- SEDIMENT POND
- SEDIMENT TRAP
- DRAINAGE INLET
- DOWNSPOUT FILTER
- PROJECT SITE BOUNDARY
- IMPERVIOUS AREA
- STORM RESISTANT SHELTER
- DUST SCREEN
- ECOBLOCK WALL
- DRAINAGE MANAGEMENT AREA
- 1 DRAINAGE MANAGEMENT AREA ID

1 OFFICE
2 RAW/FINISHED PRODUCT - PALLETIZED, SEALED & COVERED
3 LOADING/UNLOADING AREA
4 GRINDER/COCO HYDRATION BUILDING
5 ENCLOSED COMPOST STORAGE
6 MAINTENANCE SHOP
7 FINISHED COCO STORAGE
8 WATER TANK
9 EMPLOYEE PARKING
10 SAW DUST STOCKPILE
11 BULK TOTE PAD
12 COCO PROCESS WATER, LINED POND
13 COCO SQUEEZER
14 BULK YARD
15 PAVED FOREST HUMUS AREA
16 SEDIMENT TRAP
17 BAGGING LINE (AMENDMENTS IN DUST HUT)
18 HYDRATION WATER CONVEYANCE SYSTEM TO SANITARY SEWER
19 AMENDMENT STORAGE (SEALED & PALETIZED)
20 SPILL KIT
21 FUELING AREA
22 GUTTER INTERCEPTOR
23 TRUCK/VEHICLE/EQUIPMENT STORAGE
24 WASTE DISPOSAL AREA
25 FLOATING TREATMENT ISLANDS (FTI)
26 PROCESSED WATER TANKS (SEE 18)
27 WASTE SOIL PILE
28 CHIP BIN
29 BREAK-DOWN BIN
30 PEAT BARN
31 MAIN ENTRANCE

0 200'
1 " = 200 '±

RINSE STATION
BIOSWALE
SCREENER
BIOSWALE
VEGETATED GEOTEXTILE FABRIC LINED DITCH W/ FLOATING TREATMENT ISLAND, GRAVEL BAG BERMS, OIL BOOM & FIBER MEDIA SOCK
BARN
CONCRETE SEDIMENT TRAP W/ GRAVEL BAG CHECK DAMS & FIBER MEDIA SOCK, WITH 1 FTI
CONCRETE SWALE W/ GRAVEL BAG CHECK DAMS & FIBER MEDIA SOCK
TRUCK EXIT
DUMPSTER
TRUCK EXIT
GLENDALE DRIVE

*DISCHARGE LOCATIONS 2, 3, & 5 ARE POLYPROPYLENE LINED DITCH W/ GRAVEL BAG CHECK DAMS & FIBER MEDIA SOCKS

IMAGE SOURCE: GOOGLE EARTH, 2019

NOTES: SUB SURFACE STORMWATER CONVEYANCE SYSTEMS ARE DRAWN AS ESTIMATED LOCATIONS
FEATURES DRAWN SUCH AS CHECK DAMS ARE REPRESENTATIONS AND DO NOT ILLUSTRATE ACTUAL QUANTITY

Path: \\Arcata\Projects\2016\016098A-Royal-Gold\GIS\Figures\SWPPP\SWPA5\SWPA5_Fig2_BMPLocationMap.mxd User Name: jsousa DATE: 6/30/21, 1:38PM

Royal Gold SWPPP Glendale, Humboldt County, California	BMP Location Map SHN 016098.002	
June 2021	SWPA5_Fig2_BMPLocationMap	Figure 2

Regionally Occurring Special-status Botanical Species Scoping List

6

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Abronia umbellata var. breviflora	pink sand-verbena	Nyctagin-aceae	None	None	G4G5-T2	S1	1B.1	June-Oct.	Coastal dunes and coastal strand.	Foredunes and interdunes with sparse cover. Usually the plant closest to the ocean. 0-10 m	None
Angelica lucida	sea-watch	Apiaceae	None	None	G5	S3	4.2	May-Sept.	Coastal strand	Coastal bluff scrub, coastal dunes, coastal scrub, coastal salt marshes. 0-150 m	None
Astragalus pycnostachyus var. pycnostachyus	coastal marsh milk-vetch	Fabaceae	None	None	G2T2	S2	1B.2	April-Oct.	Coastal dunes, marshes & swamps, coastal scrub.	Mesic sites in dunes or along streams or coastal salt marshes. 0-155 m.	None
Astragalus rattanii var. rattanii	Rattan's milk-vetch	Fabaceae	None	None	G4T4	S4	4.3	April-July	Chaparral, cismontane woodland, lower montane conifer forest.	Open grassy hillsides, gravelly flats in valleys, & gravel bars of stream beds. 30-825 m.	Moderate
Astragalus umbraticus	Bald Mountian milk-vetch	Fabaceae	None	None	G3	S2	2B.3	May-August	Cismontane woodland, lower montane coniferous forest.	Dry open oak and pine woodlands; sometimes on roadsides. 210-1220 m	Low

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Bryoria pseudocapillaris	false gray horsehair lichen	Parmeli-aceae	None	None	G3	S2	3.2	Lichen	Coastal dunes, N. Coast conifer forest (immediate coast).	Usually on conifers. 0-90 m.	None
Bryoria spiralifera	twisted horsehair lichen	Parmeli-aceae	None	None	G3	S1S2	1B.1	Lichen	North coast conifer forest.	Usually on conifers. 0-30 m.	None
Calamagrostis bolanderi	Bolander's reed grass	Poaceae	None	None	G4	S4	4.2	May-August	Closed-cone conifer forest, N. coast conifer forest, broadleaf upland forest, coast scrub, marsh & swamps, meadows & seeps, bogs & fens.	Mesic sites. 0-455 m.	Low
Cardamine angulata	seaside bittercress	Brassic-aceae	None	None	G5	S1	2B.1	Jan.-July	Low montane, conifer forest, N. coast conifer forest, wetland	Wet areas, streambanks. 90-155 m.	Low
Carex arcta	northern clustered sedge	Cyperaceae	None	None	G5	S1	2B.2	June-Sept.	Bogs and fens, north coast conifer forest.	Mesic sites. 60-1405 m.	None
Carex buxbaumii	Buxbaum's sedge	Cyperaceae	None	None	G5	S3	4.2	March-August	Bogs and fens, meadows and seeps, marshes and swamps.	Mesic sites. 3-3300 m.	None
Carex lenticularis var. limnophila	lagoon sedge	Cyperaceae	None	None	G5T5	S1	2B.2	June-August	Bogs & fens, marsh & swamp, N. coast conifer forest.	Lakeshores, beaches. Often gravelly substrates. 0-6 m.	None
Carex leptalea	bristle-stalked sedge	Cyperaceae	None	None	G5	S1	2B.2	March-July	Bogs and fens, meadows and seeps, marshes and swamps.	Mostly known from bogs and wet meadows. 3-1395 m.	Low
Carex lyngbyei	Lyngbye's sedge	Cyperaceae	None	None	G5	S3	2B.2	April-August	Marsh & swamp (brackish or freshwater).	0-200 m.	None

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Carex praticola	northern meadow sedge	Cyperaceae	None	None	G5	S2	2B.2	May-July	Meadows and seeps.	Moist to wet meadows. 15-3200 m.	None
Carex viridula ssp. viridula	green yellow sedge	Cyperaceae	None	None	G5T5	S2	2B.3	June-July	Bogs, fens, marshes , swamps (freshwater), north coast coniferous forest.	Mesic sites. 0-1705 m.	None
Castilleja ambigua var. humboldtiensis	Humboldt Bay owl's-clover	Orobanch-aceae	None	None	G4T2	S2	1B.2	April-August	Marshes and swamps.	Coastal saltmarsh with *Spartina, Distichlis, Salicornia, Jaumea.* 0-20 m.	None
Castilleja litoralis	Oregon coast paintbrush	Orobanch-aceae	None	None	G3	S3	2B.2	June	Coastal bluff scrub, coastal dunes, coastal scrub.	Sandy sites. 5-255 m.	None
Castilleja mendocinensis	Mendocino Coast paintbrush	Orobanch-aceae	None	None	G2	S2	1B.2	April-August	Coast bluff scrub, coast scrub, coastal prairie, closed-cone conifer forest, coastal dunes.	Sea bluffs, cliffs in coastal bluff scrub or prairie. 0-160 m.	None
Chloropyron maritimum ssp. palustre	Point Reyes salty bird's-beak	Orobanch-aceae	None	None	G4?T2	S2	1B.2	June-Oct.	Coastal salt marsh.	Coastal salt marsh with *Salicornia, Distichlis, Jaumea, Spartina*, etc. 0-10 m.	None
Chrysosplenium glechomifolium	Pacific golden saxifrage	Saxifrag-aceae	None	None	G5	S3	4.3	Feb.-June	North Coast conifer forest, riparian forest	Streambanks, seeps, or roadsides. 10-220 m.	Low

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Collinsia corymbosa	round-headed Chinese-houses	Plantaginaceae	None	None	G1	S1	1B.2	April-June	Coastal dunes.	10-30 m.	None
Coptis laciniata	Oregon goldthread	Ranunculaceae	None	None	G4	S3	4.2	March-April	North Coast coniferous forest, meadows and seeps.	Mesic sites such as moist streambanks. 0-1000 m.	None
Discelium nudum	naked flag moss	Disceliaceae	None	None	G4G5	S1	2B.2	Moss	Coastal bluff scrub.	Moss on moist silty clay to fine sandy banks in some-what shaded sites. 10-50 m.	None
Eleocharis parvula	small spikerush	Cyperaceae	None	None	G5	S4	4.3	July-August	Marsh & swamp, salt marsh, wetland	In coastal salt marshes. 1-3020 m.	None
Empetrum nigrum	black crowberry	Ericaceae	None	None	G5	S1	2B.2	July-August	Coastal bluff scrub, coastal prairie.	3-15 m.	None
Epilobium septentrionale	Humboldt County fuchsia	Onagraceae	None	None	G4	G4	4.3	July-Sept.	Broadleaf upland forest, north coast coniferous forest.	Dry, sandy or rocky ledges. 45-1800 m.	None
Erigeron bloomeri var. nudatus	Waldo daisy	Asteraceae	None	None	G5T4	S3	2B.3	June-July	Lower montane coniferous forest, upper montane coniferous forest.	In open areas on dry rocky outcrops on serpentine. 730-1740 m.	None
Erysimum menziesii	Menzies' wallflower	Brassic-aceae	E	E	G1	S1	1B.1	March-Sept.	Coastal dunes.	Localized on dunes and coastal strand. 0-35 m.	None

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Erythronium oregonum	giant fawn lily	Liliaceae	None	None	G4G5	S2	2B.2	March-June	Cismontane woodland, meadows and seeps.	Openings. Sometimes on serpentine; rocky sites. 300-1435 m.	None
Erythronium revolutum	coast fawn lily	Liliaceae	None	None	G4G5	S3	2B.2	March-August	Bogs & fens, broadleaf upland forest, North coast coniferous forest.	Mesic sites; streambanks. 60-1405 m.	Low
Fissidens pauperculus	minute pocket moss	Fissident-aceae	None	None	G3?	S2	1B.2	Lichen	North coast coniferous forest, Redwood.	On damp soil along the coast. In dry streambeds and on stream banks. 10-1024 m.	None
Fritillaria purdyi	Purdy's fritillary	Liliaceae	None	None	G4	S4	4.3	March-June	Chaparral, cismontane wood-land, low montane conifer forest.	Usually on serpentine. 175-2255 m.	None
Gilia capitata ssp. pacifica	Pacific gilia	Polemoni-aceae	None	None	G5T3	S2	1B.2	April-August	Coastal bluff scrub, chaparral, coastal prairie, valley & foothill grassland.	5-1345 m.	Low
Gilia millefoliata	dark-eyed gilia	Polemoni-aceae	None	None	G2	S2	1B.2	April-July	Coastal dunes.	1-60 m.	None
Glehnia littoralis ssp. leiocarpa	American glehnia	Apiaceae	None	None	G5T5	S3	4.2	May-August	Coastal dunes	0-20 m.	None
Hemizonia congesta ssp. tracyi	Tracy's tarplant	Asteraceae	None	None	G5T4	S4	4.3	May-Oct.	Coastal prairie, North coast conifer forest, ultramafic, valley & foothill grassland	Openings; sometimes on serpentine. 120-1200 m.	None

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Hesperevax sparsiflora var. brevifolia	short-leaved evax	Asteraceae	None	None	G4T3	S2	1B.2	March-June	Coastal bluff scrub, coastal dunes, coastal prairie.	Sandy bluffs and flats. 0-215 m.	None
Hosackia gracilis	harlequin lotus	Fabaceae	None	None	G4	S3	4.2	March-July	Broadleaf upland forest, coast bluff scrub, coast prairie, coast scrub, closed-cone conifer forest, N. coast conifer forest, valley & foothill grassland.	Wetlands and roadsides. Meadow, seep, marsh & swamp. 0-700 m.	Moderate
Iliamna latibracteata	California globe mallow	Malvaceae	None	None	G2G3	S2	1B.2	June-August	N. coast conifer forest, chaparral, low montane conifer forest, riparian scrub (streambanks).	Seepage areas in silty clay loam. 60-2000 m.	Low
Juncus nevadensis var. inventus	Sierra rush	Juncaceae	None	None	G5T3-T4	S1	2B.2	July-Nov.	Bogs and fens, Wetlands.	0-10 m.	None
Lasthenia californica ssp. macrantha	perennial goldfields	Asteraceae	None	None	G3T2	S2	1B.2	Jan.-Nov.	Coastal bluff scrub, coastal dunes, coastal scrub.	5-185 m.	None
Lathyrus glandulosus	sticky pea	Fabaceae	None	None	G3	S3	4.3	April-June	Cismontane woodland.	In oak woodlands upland from the coast redwood forests & along roadsides. 300-800 m.	Low
Lathyrus japonicus	seaside pea	Fabaceae	None	None	G5	S2	2B.1	May-August	Coastal dunes.	3-65 m.	None

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Lathyrus palustris	marsh pea	Fabaceae	None	None	G5	S2	2B.2	March-August	Bogs & fens, lower montane conifer forest, marsh & swamp, North coast coniferous forest, coastal prairie, coastal scrub.	Moist coastal areas. 2-140 m.	None
Layia carnosa	beach layia	Asteraceae	E	E	G2	S2	1B.1	March-July	Coastal dunes, coastal scrub.	On sparsely vegetated, semi-stabilized dunes, usually behind foredunes. 0-30 m.	None
Lilium kelloggii	Kellogg's lily	Liliaceae	None	None	G3	S3	4.3	May-August	Lower montane conifer forest, N. coast conifer forest.	Gaps and roadsides in conifer forest. 3-1300 m.	Low
Lilium occidentale	western lily	Liliaceae	E	E	G1	S1	1B.1	June-July	Coastal scrub, freshwater marsh, bogs & fens, coastal bluff scrub, coast prairie, N. coast conifer forest, marshes and swamps.	Well-drained, old beach washes overlain with wind-blown alluvium and organic topsoil; usually near margins of Sitka spruce. 3-110 m.	None
Listera cordata	heart-leaved twayblade	Orchidaceae	None	None	G5	S4	4.2	Feb.-July	Low montane conifer forest, North coast coniferous forest, bogs & fen.	5-1370 m.	Low

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Lycopodiella inundata	inundated bog-clubmoss	Lycopodi-aceae	None	None	G5	S1	2B.2	June-Sept.	Bogs and fens, lower montane coniferous forest, marshes and swamps.	Peat bogs, muddy depressions, pond margins. 5-915 m.	None
Lycopodium clavatum	running-pine	Lycopodi-aceae	None	None	G5	S3	4.1	June-Sept.	Lower montane conifer forest, north coast conifer forest, marsh & swamp.	Forest understory, edges, openings, roadsides; mesic sites with partial shade and light. 45-1225 m.	Low
Lycopus uniflorus	northern bugleweed	Lamiaceae	None	None	G5	S4	4.3	July-Sept.	Bogs and fens, marshes and swamps, wetlands.	Wet places. 5-2000 m.	Low
Mitellastra caulescens	leafy-stemmed mitrewort	Saxifrag-aceae	None	None	G5	S4	4.2	March-Oct.	Broadleaf upland forest, lower montane and N. coast conifer forests, meadows & seeps	Mesic sites. 5-1700 m.	Low
Monotropa uniflora	ghost-pipe	Ericaceae	None	None	G5	S2	2B.2	June-Sept.	Broadleaf upland forest, north coast conifer forest.	Often under redwoods or west hemlock. 15-855 m.	None
Montia howellii	Howell's montia	Montiaceae	None	None	G3G4	S2	2B.2	Feb.-May	Meadows and seeps, north coast coniferous forest, vernal pools.	Vernally wet sites; often on compacted soil. 10-1005 m.	High

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
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Oenothera wolfii	Wolf's evening-primrose	Onagraceae	None	None	G2	S1	1B.1	May-Oct.	Coastal bluff scrub, coastal dunes & prairie, low montane conifer forest.	Sandy substrates; usually mesic sites. 0-125 m.	None
Packera bolanderi var. bolanderi	seacoast ragwort	Asteraceae	None	None	G4T4	S2S3	2B.2	Jan.-August	Coastal scrub, north coast conifer forest.	Often along roadsides. 30-915 m.	Low
Piperia candida	white-flowered rein orchid	Orchidaceae	None	None	G3	S3	1B.2	May-Sept.	N. coast conifer forest, low montane conifer forest, broadleaf upland forest.	Sometimes on serpentine. Forest duff, mossy banks, rock outcrops, and muskeg. 45-1615 m.	None
Pityopus californicus	California pinefoot	Ericaceae	None	None	G4G5	S4	4.2	March-August	Broadleaf upland forest, upper montane and, N. coast conifer forest, low montane conifer forest.	Deep shade with few understory species, often under layer of duff, in rocky to clay loam soil. 15-2225 m.	None
Pleuropogon refractus	nodding semaphore grass	Poaceae	None	None	G4	S4	4.2	March-August	Meadow & seep, low montane conifer forest, N. coast conifer forest, riparian forest.	Mesic sites along streams, grassy flats in shaded redwood groves. 0-1600 m.	Moderate
Polemonium carneum	Oregon polemonium	Polemoni-aceae	None	None	G3G4	S2	2B.2	April-Sept.	Coast scrub & prairie, low montane conifer forest.	0-1830 m.	None

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Ribes laxiflorum	trailing black currant	Grossulari-aceae	None	None	G5	S4	4.3	March-August	N. coast conifer forest, Redwood forests.	Grows on logs and stumps in moist, wet places. 5-1395 m.	Moderate
Romanzoffia tracyi	Tracy's romanzoffia	Boragin-aceae	None	None	G4	S2	2B.3	March-May	Coastal bluff scrub, coastal scrub.	Rocky sites. 15-300 m.	None
Silene scouleri ssp. *scouleri*	Scouler's catchfly	Caryophyllaceae	None	None	G5T4T5	S2S3	2B.2	(Mar-May) Jun-Aug (Sep)	Coastal bluff scrub, Coastal prairie, Valley and foothill grassland	0 - 600 meters	Low
Sidalcea malachroides	maple-leaved checkerbloom	Malvaceae	None	None	G3	S3	4.2	March-August	Broadleaf upland forest, coast prairie, coast scrub, N. coast conifer forest,riparian.	Woodlands and clearings near coast; often in disturbed areas. 0-730m.	Moderate
Sidalcea malviflora ssp. patula	Siskiyou checkerbloom	Malvaceae	None	None	G5T2	S2	1B.2	May-August	Coast bluff scrub, coast prairie, north coast conifer forest.	Open coastal forest; roadcuts. 5-1255 m.	Low
Sidalcea oregana ssp. eximia	coast checkerbloom	Malvaceae	None	None	G5T1	S1	1B.2	June-August	Meadow & seep, N. coast & low montane conifer forest.	Near meadows, in gravelly soil. 5-1805 m.	Low
Spergularia canadensis var. occidentalis	western sand-spurrey	Caryophyll-aceae	None	None	G5T4	S1	2B.1	June-August	Marshes and swamps (coastal salt marshes).	0-3 m.	None
Tiarella trifoliata var. trifoliata	trifoliate laceflower	Saxifrag-aceae	None	None	G5T5	S2S3	3.2	June-August	Lower montane coniferous forest, north coast coniferous forest.	Forest edge; moist shady banks. 170-1500 m.	None

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Trichodon cylindricus	cylindrical trichodon	Ditrichaceae	None	None	G4	S2	2B.2	Moss	Broadleaf upland forest, upper montane conifer forest.	Openings on sandy or clay soil on roadsides, stream banks, trails, fields. 50-1500 m.	Low
Usnea longissima	Methuselah's beard lichen	Parmeli-aceae	None	None	G4	S4	4.2	Lichen	North coast coniferous forest, broadleaf upland forest.	In the "redwood zone" on tree branches, incl. big leaf maple, oaks, ash, Douglas-fir, and bay. 45-1465 m in CA.	Low
Viola palustris	alpine marsh violet	Violaceae	None	None	G5	S1S2	2B.2	March-August	Coastal scrub, bogs and fens.	Swampy, shrubby places in coast scrub or coastal bogs. 0-150 m.	None

1. Species indicator status as assigned by Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and California Department of Fish and Wildlife (CDFW)

C: candidate
CT: candidate threatened
D: delisted
DPS: distinct population segment
E: endangered
ESU: evolutionarily significant unit
FP: fully protected
PT: proposed threatened
SSC: species of special concern
T: threatened
WL: watch list

Regionally Occurring Special-status Botanical Species Scoping List CNDDB, CNPS, IPaC Royal Gold, LLC Arcata North and Surrrounding 7.5-Minute Quadrangles											
Scientific Name	Common Name	Family	FedList	CalList	GRank	SRank	RPlant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
2. Species Heritage rank as assigned by California Department of Fish and Wildlife (CDFW) G1/S1: critically imperiled G2/S2: imperiled G3/S3: vulnerable G4/S4: apparently secure G5/S5: secure											

Regionally Occurring Special-status Botanical Species Scoping List

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Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Amphibians										
Ascaphus truei	Pacific tailed frog	None	None	SSC	G4	S3S4	Aquatic, Klamath/ N. coast flowing waters, Lower montane conifer, North coast conifer, Redwood, and Riparian forests	Occurs in montane hardwood-conifer, redwood, Douglas-fir & ponderosa pine habitats.	Restricted to perennial montane streams. Tadpoles require water below 15 degrees C.	None
Plethodon elongatus	Del Norte salamander	None	None	WL	G4	S3	Old-growth associated species with optimum conditions in the mixed conifer/hardwood ancient forest ecosystem.	Old-growth.	Cool, moist, stable micro-climate, deep litter layer, closed multi-storied canopy, dominant large, old trees.	None
Rana aurora	northern red-legged frog	None	None	SSC	G4	S3	Klamath/North coast flowing waters, Riparian forest, Riparian woodland	Humid forests, woodlands, grasslands, & streamsides in northwestern California, usually near dense riparian cover.	Generally near permanent water, but can be found far from water, in damp woods and meadows, during non-breeding season.	**Present**
Rana boylii	foothill yellow-legged frog	E	None	SSC	G3	S3	Aquatic, Chaparral, Cismontane woodland, Coastal scrub, Klamath/North coast flowing waters, Lower montane conifer forest, Meadow & seep, Riparian forest & woodland	Partly-shaded, shallow streams & riffles with a rocky substrate in a variety of habitats.	Need at least some cobble-sized substrate for egg-laying. Need at least 15 weeks to attain metamorphosis.	Low
Rhyacotriton variegatus	southern torrent salamander	None	None	SSC	G3G4	S2S3	Lower montane conifer forest, Old-growth, Redwood, Riparian forest	Coastal redwood, Douglas-fir, mixed conifer, montane riparian, and montane hardwood-conifer habitats. Old-	Cold, well-shaded, permanent streams and seepages, or within splash zone or on moss-covered rock within trickling water.	None

Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
								growth forest.		
Birds										
Accipiter cooperii	Cooper's hawk	None	None	WL	G5	S4	Cismontane woodland Riparian forest, Riparian woodland, Upper montane conifer forest	Woodland, chiefly of open, interrupted or marginal type.	Nest sites mainly in riparian deciduous trees, as in canyon bottoms on river floodplains; also, live oaks.	Moderate
Accipiter striatus	sharp-shinned hawk	None	None	WL	G5	S4	Coniferous forest Forest edge	Wide range of elevations, from sea level to treeline.	Dense, closed canopy forest for nesting.	Low
Ardea alba	great egret	None	None	-	G5	S4	Brackish marsh, estuary, freshwater marsh, marsh & swamp, riparian forest, wetland	Colonial nester in large trees.	Rookery sites near marshes, tide-flats, irrigated pastures, margins of rivers and lakes.	Moderate
Ardea herodias	great blue heron	None	None	-	G5	S4	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland	Colonial nester in tall trees, cliffsides, and sequestered spots on marshes.	Rookery sites in close proximity to foraging areas: marshes, lake margins, tide-flats, rivers, streams, wet meadows.	Moderate
Asio flammeus	Short-eared owl	None	None	SSC	G5	S3	Grasslands, Savannah Marshes, Dunes	Open areas, low vegetation. Wintering sometimes near dunes and weedy fields.	Nest on the ground amid grasses and low plants in a dry spot.	Low
Brachyramphus marmoratus	marbled murrelet	T	E		G3G4	S2	Lower montane conifer forest, Old-growth Redwood	Feeds near-shore; nests inland along coast from Eureka to Oregon border.	Nests in old-growth redwood-dominated forests, up to 6 mi. inland, often in Douglas-fir.	Low (flyover)
Botaurus lentiginosus	American bittern	None	None	-	G4	S3S4	Freshwater marshes Wetlands Grasslands	In winter they move to areas where water bodies don't freeze, especially near the coast, where they occasionally use brackish	Mainly in freshwater marshes with tall vegetation.	Low

Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
								marshes.		
Cerorhinca monocerata	rhinoceros auklet	None	None	WL	G5	S3	Spends the majority of its life in the open ocean and along coastlines.	Off-shore islands and rocks along the California coast.	Nests in burrow on undisturbed, forested and unforested, and in cliff caves on the mainland.	None
Charadrius alexandrinus nivosus	western snowy plover	T	None	SSC	G3T3	S2S3	Great Basin standing waters, sand shore, Wetland	Sandy beaches, salt pond levees & shores of large alkali lakes.	Needs sandy, gravelly or friable soils for nesting.	None
Charadrius montanus	mountain plover	None	None	SSC	G3	S2S3	Chenopod scrub Valley & foothill grassland	Short grasslands, freshly plowed fields, newly sprouting grain fields, & sometimes sod farms.	Short vegetation, bare ground & flat topography. Prefers grazed areas & w/ burrowing rodents.	None
Circus cyaneus	northern harrier	None	None	SSC	G5	S3	Coastal scrub Great Basin grassland Marsh & swamp Riparian scrub	Coastal salt & fresh-water marsh. Nest & forage in grasslands, from salt grass in desert sink to mountain cienagas.	Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	Low
Coccyzus americanus occidentalis	western yellow-billed cuckoo	T	E	-	G5T2T3	S1	Riparian forest	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems.	Nests in riparian jungles of willow, mixed with cottonwoods, w/lower story of blackberry, nettles, or wild grape.	None
Egretta thula	snowy egret	None	None	-	G5	S4	Marsh & swamp, Meadow & seep, riparian forest, Riparian woodland, Wetland	Colonial nester, with nest sites situated in protected beds of dense tules.	Rookery sites situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, & borders of lakes.	Low
Elanus leucurus	white-tailed kite	None	None	FP	G5	S3S4	Cismontane woodland, Marsh & swamp, Riparian woodland, Valley & foothill grassland | Wetland	Rolling foothills and valley margins with scattered oaks & river bottomlands or marshes next to	Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped	Low

Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
								deciduous woodland.	trees for nesting and perching.	
Empidonax traillii brewsteri	Little willow flycatcher	None	E	-	G5T3T4	S1S2	Meadow & seep Riparian scrub Riparian woodland Wetland	Inhabits extensive thickets of low, dense willows on edge of wet meadows, ponds, or backwaters; 2,000-8,000 ft elevation	Requires dense willow thickets for nesting/roosting. Low, exposed branches are used for singing posts/hunting perches.	Low
Falco columbarius	merlin	None	None	WL	G5	S3S4	Estuary Great Basin grassland Valley & foothill grassland	Seacoast, tidal estuaries, open woodlands, savannahs, edges of grasslands and deserts, farms and ranches.	Clumps of trees or windbreaks are required for roosting in open country.	Low
Falco peregrinus anatum	American peregrine falcon	D	D	FP	G4T4	S3S4	Feed exclusively on smaller bird species. Wide variety of habitats across the globe.	Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures.	Nest consists of a scrape or a depression or ledge in an open site.	Moderate
Fratercula cirrhata	tufted puffin	None	None	SSC	G5	S1S2	Protected deep-water coastal communities	Open-ocean bird; nests along the coast on islands, islets, or (rarely) mainland cliffs.	Requires sod or earth into which the birds can burrow, on island cliffs or grassy island slopes.	None
Haliaeetus leucocephalus	bald eagle	D	E	FP	G5	S3	Lower montane coniferous forest Old-growth	Ocean shore, lake margins, & rivers for both nesting & wintering. Most nests within 1 mi of water.	Nests in large, old-growth, or dominant live tree w/open branches, especially ponderosa pine. Roosts communally in winter.	Low
Icteria virens	yellow-breasted chat	None	None	SSC	G5	S3	Riparian forest riparian scrub, riparian woodland	Summer resident; inhabits riparian thickets of willow & other brushy tangles	Nests in low, dense riparian, consisting of willow, blackberry, and	Moderate

Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
								near watercourses.	wild grape; forages and nests within 10 ft of ground.	
Numenius americanus	long-billed curlew	None	None	WL	G5	S2	Great Basin grassland Meadow & seep	Breeds in upland shortgrass prairies & wet meadows in northeastern California.	Habitats on gravelly soils and gently rolling terrain are favored over others.	None
Nycticorax nycticorax	black-crowned night heron	None	None	-	G5	S4	Marsh & swamp, riparian forest, Riparian woodland, Wetland	Colonial nester, usually in trees, occasionally in tule patches.	Rookeries adjacent to forage areas: lake margins, mud-bordered bays, marshy spots.	Low
Oceanodroma furcata	fork-tailed storm-petrel	None	None	SSC	G5	S1	Protected deep-water coastal communities	Colonial nester on small, offshore islets. Forages over the open ocean, usually well offshore.	Birds choose offshore islets which provide nesting crannies beneath rocks or sod for burrowing.	None
Pandion haliaetus	osprey	None	None	WL	G5	S4	Riparian forest	Ocean shore, bays, fresh-water lakes, and larger streams.	Large nests built in tree-tops within15 miles of a fish-producing body of water.	Low
Pelecanus occidentalis californicus	California brown pelican	D	D	FP	G4T3T4	S3	Rests on piers, sandbars, pilings, jetties, breakwaters and offshore rocks when not nesting or feeding.	Colonial nester on coastal islands just outside the surf line.	Nests on coastal islands of small to moderate size which afford immunity from ground-dwelling predators. Roosts communally.	None
Phalacrocorax auritus	double-crested cormorant	None	None	WL	G5	S4	Riparian forest, Riparian scrub, Riparian woodland	Colonial nester on coastal cliffs, offshore islands, & along lake margins in the interior of the state.	Nests along coast on sequestered islets, usually on ground with sloping surface, or in tall trees along lake margins.	None
Poecile	black-capped	None	None	WL	G5	S3	Riparian woodland	Inhabits riparian	Mainly found in deciduous	High

Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
atricapillus	chickadee							woodlands in Del Norte and northern Humboldt counties.	tree-types, especially willows and alders, along large or small watercourses.	
Ptychoramphus aleuticus	Cassin's auklet	None	None	SSC	G4	S3	Open ocean for feeding.	Offshore islands with enough soil for burrowing. Will also nest in rock crevices, under buildings & in debris.	Uses burrows for nesting, vulnerable to predation, travels to and from the nest during the night.	None
Riparia riparia	bank swallow	None	T	-	G5	S2	Riparian scrub, Riparian woodland	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert.	Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	None
Setophaga petechia	yellow warbler	None	None	SSC	G5	S4	Riparian forest, riparian scrub, riparian woodland	Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in Cascades and Sierra Nevada.	Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	Moderate
Strix occidentalis caurina	northern spotted owl	T	T	SSC	G3T3	S2	North coast coniferous forest, Old-growth Redwood	Old-growth forests or mixed stands of old-growth & mature trees. Occasional in younger forests w/ patches of big trees.	High, multistory canopy dominated by big trees, many trees w/cavities or broken tops, woody debris & space under canopy.	Low
Fish										
Acipenser medirostris	green sturgeon	T	None	SSC	G3	S2	Aquatic, Klamath/North coast flowing waters, Sacramento/San Joaquin	These are the most marine species of sturgeon. Abundance	Spawns at temps between 8-14 C. Preferred spawning substrate is large	None

Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
							flowing waters	increases northward of Point Conception. Spawns in the Sacramento, Klamath, and Trinity Rivers.	cobble, but can range from clean sand to bedrock.	
Entosphenus tridentatus	Pacific lamprey	None	None	SSC	G4	S4	Aquatic, Klamath/North coast flowing waters Sacramento/San Joaquin flowing waters South coast flowing waters	Found in Pacific Coast streams north of San Luis Obispo Co., however regular runs in Santa Clara River. Size of runs is declining.	Swift-current gravel-bottomed areas for spawning with water temps between 12-18 C. Ammocoetes need soft sand or mud.	None
Eucyclogobius newberryi	tidewater goby	E	None	SSC	G3	S3	Aquatic, Klamath/North coast flowing waters, Sacramento/ San Joaquin flowing waters, South coast flowing waters	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River.	Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water & high oxygen levels.	None
Lampetra richardsoni	Western brook lamprey	None	None	SSC	G4G5	S3S4	Gravel-bottom streams	Riffles and side channels of freshwater streams.	Silty backwater areas for ammocoete rearing.	Low
Oncorhynchus clarkii clarkii	coast cutthroat trout	None	None	SSC	G4T4	S3	Aquatic, Klamath/North coast flowing waters	Small coastal streams from the Eel River to the Oregon border.	Small, low gradient coastal streams & estuaries. Need shaded streams with water temps <18C, & small gravel for spawning	None
Oncorhynchus kisutch	coho salmon - southern Oregon / northern California ESU	T	T	-	G4T2Q	S2	Aquatic, Klamath/North coast flowing waters, Sacramento/ San Joaquin flowing waters.	Fed listing refers to populations between Cape Blanco, Oregon & Punta Gorda, Humboldt County, California.	State listing refers to populations between the Oregon border & Punta Gorda, California.	None

Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Oncorhynchus mykiss irideus	steelhead - northern California DPS	T	None	-	G5T2-T3Q	S2S3	Aquatic Klamath/North coast flowing waters	Streams between Elk River, Oregon and the Klamath & Trinity rivers in California, inclusive.	Minimum water depth for upstream migration is 18 cm. Water velocities greater than 3-4 m/sec may impede upstream progress.	None
Oncorhynchus tshawytscha	chinook salmon - upper Klamath and Trinity Rivers ESU.	None	None	SSC	G5	S1S2	Aquatic Sacramento/San Joaquin flowing waters	Federal listing refers to wild spawned, coastal, spring & fall runs between Redwood Cr, Humboldt Co & Russian R., Sonoma Co	Major limiting factor for juvenile chinook salmon is temperature, which strongly effects growth & survival.	None
Spirinchus thaleichthys	longfin smelt	C	T	SSC	G5	S1	Aquatic, Estuary	Euryhaline, nektonic & anadromous. Open waters of estuaries, mostly mid to bottom of water column.	Prefer salinities of 15-30 ppt, but can be found in completely freshwater to almost pure seawater.	None
Thaleichthys pacificus	eulachon	T	None	-	G5	S2	Aquatic Klamath/North coast flowing waters	Found in Klamath River, Mad River, Redwood Creek & in small numbers in Smith River & Humboldt Bay tributaries.	Spawn in lower reaches of coastal rivers w/ mod. water velocity. Bottom of pea-sized gravel, sand & woody debris.	None
Insects										
Bombus caliginosus	obscure bumble bee	None	None	-	G4?		Nests underground or above ground in abandoned bird nests	Open grassy coastal plains and coast range meadows from Santa Barbara County to Washington state.	Food plant genera include *Baccharis, Cirsium, Lupinus, Lotus, Grindelia* and *Phacelia*.	Low
Bombus crotchii	Crotch bumblebee	None	CE	-	G3G4	S1S2	Grasslands Shrublands	Requires floral resources, and undisturbed nest sites and overwintering sites.	Primarily nests underground.	Low

Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Bombus occidentalis	western bumble bee	None	CE	-	G2G3	S1	Pollinate a wide variety of flowers. Will gnaw through flowers to obtain nectar their tongues are too short to reach.	Once common & widespread, species has declined precipitously from central California to southern B.C., perhaps from disease.	Nest in cavities or abandoned burrows	Low
Cicindela hirticollis gravida	sandy beach tiger beetle	None	None	-	G5T2	S2	Coastal dunes	Inhabits areas adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico.	Clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sand not affected by wave action.	None
Mammals										
Arborimus albipes	white-footed vole	None	None	SSC	G3G4	S2	North coast conifer forest, Redwood, riparian forest	Mature coastal forests in Humboldt & Del Norte Counties. Prefers areas near small, clear streams with dense alder & shrubs.	Occupies the habitat from the ground surface to the canopy. Feeds in all layers & nests on the ground under logs or rock.	Low
Arborimus pomo	Sonoma tree vole	None	None	SSC	G3	S3	North coast coniferous forest, Old-growth, Douglas-fir, redwood	North coast fog belt from Oregon border to Sonoma County. In Douglas-fir, redwood & montane hardwood-coniferous forests.	Feeds almost exclusively on Douglas-fir needles. Will occasionally take needles of grand fir, hemlock or spruce.	None
Corynorhinus townsendii	Townsend's big-eared bat	None	None	SSC	G3G4	S2	Broadleaf upland forest, seep & meadow, Chaparral, upper & low montane conifer forest, riparian forest & woodland, valley & foothill grassland	Throughout California in a wide variety of habitats. Most common in mesic sites.	Roosts in the open, hanging from walls & ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	None

Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
Erethizon dorsatum	North American porcupine	None	None	-	G5	S3	Montane coniferous forest Wet meadows	Trees, caves	Typically found in trees for resting and foraging, in caves and hollows for nesting.	Low
Lasiurus cinereus	Hoary bat	None	None	-	G5	S4	Forested habitats Dunes Chapparal	Roosts in trees, often on forest edges.	Forage above treetops and over water, roost at ends of branches of trees.	Moderate
Myotis evotis	long-eared myotis	None	None	-	G5	S3	Roosts in a wide range of substrate.	Found in all brush, woodland & forest habitats from 0 ft to about 9,000 ft. prefers conifer woodland & forest.	Nursery colonies in buildings, crevices, spaces under bark, & snags. Caves used primarily as night roosts.	Low
Pekania pennanti	fisher - West Coast DPS	None	None	SSC	G5	S2S3	North coast coniferous forest, Old-growth, riparian forest	Intermediate to large-tree stages of conifer forests & deciduous-riparian areas with high % canopy closure.	Uses cavities, snags, logs & rocky areas for cover & denning. Needs large areas of mature, dense forest.	None
Mollusks										
Margaritifera falcata	western pearlshell	None	None	-	G4G5	S1S2	Aquatic.	Aquatic.	Prefers lower velocity waters.	Low
Reptiles										
Emys marmorata	western pond turtle	None	None	SSC	G3G4	S3	Aquatic, Artificial flowing waters, Klamath/N. coast flowing waters, Klamath/N. coast standing waters, Marsh & swamp, Wetland	Aquatic turtle of ponds, marshes, rivers, streams & irrigation ditches, usually with aquatic vegetation, below 6000 ft.	Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	Low

1. Species indicator status as assigned by Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and California Department of Fish and Wildlife (CDFW)

C: candidate FP: fully protected

CT: candidate threatened PT: proposed threatened

Regionally Occurring Special-status Animal Species Scoping List CNDDB, IPaC Royal Gold, LLC January 20 and April 14, 2021										
Scientific Name	Common Name	Fedlist	CalList	Other Status	GRank	SRank	Habitats	GenHab	MicroHab	Potential of Occurrence
D: delisted DPS: distinct population segment E: endangered ESU: evolutionarily significant unit				SSC: species of special concern T: threatened WL: watch list						
2. Species Heritage rank as assigned by California Department of Fish and Wildlife (CDFW) G1/S1: critically imperiled G2/S2: imperiled G3/S3: vulnerable G4/S4: apparently secure G5/S5: secure										

IPaC Scoping List

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IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly aected by activities in the project area. However, determining the likelihood and extent of eects a project may have on trust resources typically requires gathering additional site-specic (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS oce(s) with jurisdiction in the dened project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Humboldt County, California

Local office

Arcata Fish And Wildlife Office

(707) 822-7201
(707) 822-8411

1655 Heindon Road
Arcata, CA 95521-4573

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of inuence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water ow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS

Marbled Murrelet Brachyramphus marmoratus — Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/4467

Northern Spotted Owl Strix occidentalis caurina — Threatened

Wherever found

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/1123

Western Snowy Plover Charadrius nivosus nivosus — Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/8035

Yellow-billed Cuckoo Coccyzus americanus — Threatened

There is **proposed** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/3911

Fishes

NAME	STATUS

Tidewater Goby Eucyclogobius newberryi — Endangered

Wherever found

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/57

Flowering Plants

NAME	STATUS

Beach Layia Layia carnosa — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6728

Menzies' Wallflower Erysimum menziesii — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/2935

Western Lily Lilium occidentale — Endangered

Wherever found

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/998

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Allen's Hummingbird Selasphorus sasin — Breeds Feb 1 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9637

Bald Eagle Haliaeetus leucocephalus — Breeds Jan 1 to Sep 30

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in o. shore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Great Blue Heron Ardea herodias fannini — Breeds Mar 15 to Aug 15

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Long-billed Curlew Numenius americanus — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5511

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Rufous Hummingbird selasphorus rufus — Breeds Apr 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Western Screech-owl Megascops kennicottii kennicottii — Breeds Mar 1 to Jun 30
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted

Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (▬)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

PEM1C

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Observed Botanical Species List

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Botanical Species Observed 1/17/17, 1/25/17, 7/27/2017, 4/27/2021 Royal Gold, LLC			
Scientific Name	**Common Name**	**Family**	**Native?**
Trees			
Abies grandis	grand fir	Pinaceae	Y[a]
Acer macro[b]phyllum	big leaf maple	Sapindaceae	Y
Alnus rubra	red alder	Betulaceae	Y
Crataegus monogyna	English hawthorne	Rosaceae	I[b]
Cupressus x leylandii	Leyland cypress	Cupressaceae	N[c]
Frangula purshiana ssp. *purshiana*	cascara	Rhamnaceae	Y
Hesperocyparis macrocarpa	Monterrey cypress	Cupressaceae	N
Ilex aquifolium	English holly	Aquifoliaceae	I
Notholithocarpus densiflorus	tanoak	Fagaceae	Y
Picea sitchensis	Sitka spruce	Pinaceae	Y
Pinus radicata	Monterrey pine	Pinaceae	N
Populus trichocarpa	black cottonwood	Salicaceae	Y
Prunus cerasifera	wild plum	Rosaceae	I
Pseudotsuga menziesii	Douglas fir	Pinaceae	Y
Pyrus calleryana	flowering pear	Rosaceae	I
Salix lasiandra var. *lasiandra*	pacific willow	Salicaceae	Y
Salix lasiolepis	arroyo willow	Salicaceae	Y
Salix sitchensis	Sitka willow	Salicaceae	Y
Sequoia sempervirens	coast redwood	Cupressaceae	Y
Tsuga heterophylla	western hemlock	Pinaceae	Y
Umbellularia californica	California bay tree	Lauraceae	Y
Shrubs			
Baccharis pilularis ssp. *consanguinea*	coyote brush	Asteraceae	Y
Buddleja davidii	butterfly bush	Screophulariaceae	I
Ceanothus thyrsiflorus var. *thyrsiflorus*	blueblossom	Rhamnaceae	Y
Corylus cornuta ssp. *californica*	hazelnut	Betulaceae	Y
Cotoneaster franchetii	Franchett's cotoneaster	Rosaceae	I
Cotoneaster lacteus	milkflower cotoneaster	Rosaceae	I
Cytisus scoparius	Scotch broom	Fabaceae	I
Genista monspessulana	French broom	Fabaceae	I
Hypericum calycinum	Aaron's beard	Hypericaceae	N
Lonicera involucrata var. *ledebourii*	coast twinberry	Caprifoliaceae	Y
Morella californica	California wax myrtle	Myricaceae	Y
Oemleria cerasiformis	oso berry	Rosaceae	Y
Ribes menziesii var. *menziesii*	gooseberry	Grossulariaceae	Y
Ribes sanguineum var.*sanguineum*	red flowering currant	Grossulariaceae	Y

Botanical Species Observed 1/17/17, 1/25/17, 7/27/2017, 4/27/2021 Royal Gold, LLC			
Scientific Name	**Common Name**	**Family**	**Native?**
Rosa cultivar	rose cultivar	Rosaceae	N
Rosa rubiginosa	sweetbriar	Rosaceae	N
Rubus armeniacus	Himalayan blackberry	Rosaceae	I
Rubus parviflorus	thimblebery	Rosaceae	Y
Rubus spectabilis	salmonberry	Rosaceae	Y
Rubus ursinus	California blackberry	Rosaceae	Y
Sambucus racemosa ssp. *racemosa*	red elderberry	Adoxaceae	Y
Vaccinium ovatum	evergreen huckleberry	Ericaceae	Y
Vaccinium parviflorus	red huckleberry	Ericaceae	Y
Ferns and Allies			
Athyrium filix-femina var. *cyclosorum*	lady fern	Woodsiaceae	Y
Equisetum arvense	horsetail	Equisetaceae	Y
Polystichum munitum	sword fern	Dryopteridaceae	Y
Pteridium aquilinum var. *pubescens*	western bracken fern	Dennstaedtiaceae	Y
Struthiopteris spicant	deer fern	Blechnaceae	Y
Sedges and Rushes			
Carex harfordii	Harford's sedge	Cyperaceae	Y
Carex hendersonii	Henderson's sedge	Cyperaceae	Y
Carex leptopoda	slender footed sedge	Cyperaceae	Y
Carex obnupta	slough sedge	Cyperaceae	Y
Cyperus eragrostis	three cornered sedge	Cyperaceae	Y
Cyperus involucratus	umbrella plant	Cyperaceae	N
Eleocharis acicularis	needle spikerush	Cyperaceae	Y
Eleocharis macrostachya	common spikerush	Cyperaceae	Y
Isolepis cernua	low clubrush	Cyperaceae	Y
Juncus articulatus	jointed rush	Juncaceae	Y
Juncus bolanderi	Bolander's rush	Cyperaceae	Y
Juncus bufonius var. *bufonius*	toad rush	Juncaceae	Y
Juncus effusus ssp. *pacificus*	common rush	Juncaceae	Y
Juncus ensifolius	swordleaf rush	Juncaceae	Y
Juncus occidentalis	western rush	Juncaceae	Y
Juncus patens	spreading rush	Juncaceae	Y
Luzula comosa var. *comosa*	hairy woodrush	Juncaceae	Y
Luzula subsessilis	Pacific woodrush	Juncaceae	Y
Scirpus microcarpus	panicled bulrush	Cyperaceae	Y
Grasses			
Agrostis exarata	spike bentgrass	Poaceae	Y
Agrostis stolonifera	creeping bentgrass	Poaceae	I

Botanical Species Observed 1/17/17, 1/25/17, 7/27/2017, 4/27/2021 Royal Gold, LLC			
Scientific Name	**Common Name**	**Family**	**Native?**
Aira caryophyllea	silver hairgrass	Poaceae	N
Alopecurus geniculatus	marsh foxtail	Poaceae	Y
Alopecurus pratensis	meadow foxtail	Poaceae	I
Anthoxanthum odoratum	sweet vernal grass	Poaceae	I
Avena fatua	slender wildoat	Poaceae	I
Beckmannia syzigachne	slough grass	Poaceae	Y
Briza maxima	large quaking grass	Poaceae	I
Briza minor	small quaking grass	Poaceae	N
Bromus diandrus	ripgut brome	Poaceae	I
Bromus hordeaceus	soft chess	Poaceae	I
Bromus sitchensis var. *carinatus*	California brome	Poaceae	Y
Cortaderia jubata	pampas grass	Poaceae	I
Cynosurus echinatus	bristly dogtail grass	Poaceae	I
Dactylis glomerata	orchard grass	Poaceae	I
Festuca arundinacea	tall fescue	Poaceae	I
Festuca bromoides	brome fescue	Poaceae	N
Festuca myuros	six weeks grass	Poaceae	I
Festuca perennis	Italian ryegrass	Poaceae	I
Festuca rubra	red fescue	Poaceae	Y
Glyceria declinata	manna grass	Poaceae	I
Holcus lanatus	velvet grass	Poaceae	I
Hordeum vulgare	common barley	Poaceae	N
Phalaris arundinacea	canary reedgrass	Poaceae	I
Poa annua	annual grass	Poaceae	N
Poa pratensis	Kentucky blugrass	Poaceae	I
Poa trivialis	rough bluegras	Poaceae	N
Polypogon maritimus	rabbits-foot grass	Poaceae	N
Polypogon monseliensis	rabbits foot	Poaceae	I
Rytidosperma penicillatum	hairy oatgrass	Poaceae	I
Triticum aestivum	re-green barley	Poaceae	N
Herbs			
Acmispon parviflorus	hill lotus	Fabaceae	Y
Alisma lanceolatum	water plantain	Alismataceae	N
Allium triquetrum	white flowered onion	Alliaceae	N
Anaphalis margaritacea	pearly everlasting	Asteraceae	Y
Anisocarpus madioides	woodland madia	Asteraceae	Y
Bellis perennis	English daisy	Asteraceae	N
Bidens frondosa	devil's beggartick	Asteraceae	Y
Callitriche heterophylla	water starwort	Plantaginaceae	Y
Calystegia silvatica	false bindweed	Convolvulaceae	N
Cardamine oligosperma	bittercress	Brassicaceae	Y

Botanical Species Observed 1/17/17, 1/25/17, 7/27/2017, 4/27/2021 Royal Gold, LLC			
Scientific Name	**Common Name**	**Family**	**Native?**
Cerastium fontanum ssp. *vulgare*	mouse ears	Caryophyllaceae	N
Chamerion angustifolium	fireweed	Onagraceae	Y
Cirsium vulgare	bull thistle	Asteraceae	I
Claytonia parviflora ssp. *parviflora*	narrow leaf miner's lettuce	Montiaceae	Y
Claytonia perfoliata ssp. *perfoliata*	claytonia	Montiaceae	Y
Conium maculatum	poison hemlock	Apiaceae	I
Crocosmia x crocosmiflora	montebretia	Iridaceae	I
Daucus carota	Queen Anne's lace	Apiaceae	N
Dicentra formosa ssp. *formosa*	bleeding heart	Papaveraceae	Y
Dipsacus fullonum	wild teasel	Asteraceae	I
Epilobium ciliatum ssp. *ciliatum*	fringed willowherb	Onagraceae	Y
Erigeron canadensis	Canada horseweed	Asteraceae	Y
Erodium cicutarium	crane's bill geranium	Geraniaceae	I
Euphorbia peplus	petty spurge	Euphorbiaceae	N
Euthamia occidentalis	western goldenrod	Asteraceae	Y
Foeniculum vulgare	fennel	Apiaceae	I
Galium aparine	cleaver plant	Rubiaceae	Y
Galium triflorum	sweet bedstraw	Rubiaceae	Y
Geranium dissectum	cutleaf geranium	Geraniaceae	I
Geranium molle	Crane's bill geranium	Geraniaceae	N
Geranium robertianum	Robert's geranium	Geraniaceae	N
Helminthotheca echioides	bristly ox-tongue	Asteraceae	I
Hyacinthoides non-scripta	bluebells	Asparagaceae	N
Hydrocotyle ranunculoides	marsh pennywort	Araliaceae	Y
Hypochaeris radicata	hairy cat's-ear	Asteraceae	I
Iris douglasiana	Douglas iris	Iridaceae	Y
Lamium purpureum	purple deadnettle	Lamiaceae	N
Lapsana communis	nipplewort	Asteraceae	N
Lathyrus latifolius	perennial sweetpea	Fabaceae	I
Leontodon saxatilis ssp. *saxatilis*	hawkbit	Asteraceae	N
Leucanthemum vulgare	oxeye daisy	Asteracaeae	I
Linum bienne	flax	Linaceae	N
Lotus corniculatus	bird's-foot trefoil	Fabaceae	N
Ludwigia hexapetala	six-petal waterprimrose	Onagraceae	I
Lupinus bicolor	annual lupine	Fabaceae	Y
Lupinus rivularis	riverbank lupine	Fabaceae	Y
Lupinus species	lupine (not Id'd)	Fabaceae	?
Lysimachia arvensis	scarlet pimpernel	Myrsinaceae	N
Lysimachia latifolia	pacific star flower	Myrsinaceae	Y

Botanical Species Observed 1/17/17, 1/25/17, 7/27/2017, 4/27/2021 Royal Gold, LLC			
Scientific Name	**Common Name**	**Family**	**Native?**
Lythrum hyssopifolia	hyssop loosestrife	Lythraceae	I
Madia exigua	little tarweed	Asteraceae	Y
Marah oregana	coast manroot	Cucurbitaceae	Y
Medicago polymorpha	bur clover	Fabaceae	I
Melilotus albus	white sweetclover	Fabaceae	N
Melilotus indicus	annual yellow sweetclover	Fabaceae	N
Mentha pulegium	pennyroyal	Lamiaceae	I
Myriophyllum aquaticum	parrot's feather	Haloragaceae	I
Oenanthe sarmentosa	water parsley	Apiaceae	Y
Oxalis oregana	redwood sorrel	Oxalidaceae	Y
Parentucellia viscosa	yellow glandweed	Orobanchaceae	I
Persicaria maculosa	spotted ladysthumb	Polygonaceae	N
Plantago lanceolata	English plantain	Plantaginaceae	I
Plantago major	common plantain	Plantaginaceae	N
Polygonum aviculare ssp. *aviculare*	prostrate knotweed	Polygonaceae	N
Prunella vulgaris var. *lanceolata*	pacific selfheal	Lamiaceae	Y
Prunella vulgaris var. *vulgaris*	common selfheal	Lamiaceae	N
Pseudognaphalium luteoalbum	Jersey cudweed	Asteraceae	N
Ranunculus muricatus	spiny buttercup	Ranunculaceae	N
Ranunculus repens	creeping buttercup	Ranunculaceae	I
Raphanus sativa	wild radish	Onagraceae	I
Rumex acetosella	sheep sorrel	Polygonaceae	I
Rumex crispus	curly dock	Polygonaceae	I
Rumex obtusifolius	broadleaf dock	Polygonaceae	N
Rumex pulcher	fiddle dock	Polygonaceae	N
Scandix pecten-veneris	shepherd's needle	Apiaceae	N
Senecio minimus	coastal burnweed	Asteraceae	N
Senecio vulgaris	common groundsel	Asteraceae	N
Silybum marianum	blessed milk thistle	Asteraceae	I
Sisyrinchium californicum	yellow-eyed grass	Iridaceae	Y
Sonchus asper ssp. *asper*	prickly sow thistle	Asteraceae	N
Sonchus oleraceus	sow thistle	Asteraceae	N
Spergula arvensis	corn spurry	Caryophyllaceae	N
Stachys ajugoides	bugle hedgenettle	Lamiaceae	Y
Stachys chamissonis	hedge nettle	Lamiaceae	Y
Stellaria media	chickweed	Caryophyllacea	N
Symphyotrichum chilense	pacific aster	Asteraceae	Y
Taraxacum officinale ssp. *officinale*	dandelion	Asteraceae	N
Tellima grandiflora	fringe cups	Saxifragaceae	Y
Torilis arvensis	spreading hedge parsley	Apiaceae	I
Tragopogon porrifolius	purple salsify	Asteraceae	N

Botanical Species Observed 1/17/17, 1/25/17, 7/27/2017, 4/27/2021 Royal Gold, LLC			
Scientific Name	**Common Name**	**Family**	**Native?**
Trifolium arvense	rabbitfoot clover	Fabaceae	N
Trifolium cernuum	nodding clover	Fabaceae	N
Trifolium dubium	shamrock clover	Fabaceae	N
Trifolium fragiferum	strawberry clover	Fabaceae	N
Trifolium hybridum	alsike clover	Fabaceae	N
Trifolium incarnatum	crimson clover	Fabaceae	N
Trifolium pratense	red clover	Fabaceae	N
Trifolium repens	white clover	Fabaceae	N
Trifolium subterraneum	subterranean clover	Fabaceae	N
Trillium ovatum ssp. *ovatum*	western trillium		Y
Typha latifolia	broadleaf cattail	Typhaceae	Y
Urtica dioica ssp. *gracilis*	stinging nettle	Urticaceae	Y
Veronica americana	American speedwell	Plantaginaceae	Y
Veronica arvensis	speedwell	Plantaginaceae	N
Vicia hirsuta	tiny vetch	Fabaceae	N
Vicia sativa ssp. *sativa*	spring vetch	Fabaceae	N
Vicia tetrasperma	four seeded vetch	Fabaceae	N
Vicia villosa	hairy vetch	Fabaceae	N
Zeltnera muehlenbergii	Muehlenberg's centaury	Gentianaceae	Y
Woody Vines			
Hedera helix	English ivy		I
Symphricarpos mollis	creeping snowberry		Y
Toxicodendron diversilobum	poison oak		Y
Cryptograms			
Bryum argenteum	snow moss		Y
Kindbergia praelonga	feather moss		Y
217 Species			**44% Native**

[a] Y: Yes
[b] I: Invasive
[c] N: No

Observed Animal Species List

10

Animal Species Observed 01/20/21 and 04/14/21 Royal Gold, LLC				
Scientific Name	Common Name	Family	Nesting Habit	Listed?
Amphibians				
Rana aurora	Northern red-legged frog	Ranidae	Egg-laying occurs in vegetated shallows with little water flow in permanent wetlands and temporary pools.	SSC
Pseudacris regilla	Pacific treefrog	Hylidae	Breeding locations include slow streams, permanent and seasonal ponds or pools, including roadside ditches and potholes.	No
Taricha granulosa	Rough-skinned newt	Salamandridae	Egg laid in temporary and permanent ponds, lakes, slow edges of streams and creeks	No
Birds				
Buteo jamaicensis	Red-tailed hawk	Accipitridae	Nests typically in crowns of tall trees where they have a commanding view of the landscape.	No
Callipepla californica	California quail	Odontophoridae	The nest is on the ground, usually a shallow depression lined with stems and grasses, and often placed near vegetation or rocks for protection.	No
Cathartes aura	Turkey vulture	Cathartidae	Nest in rock crevices, caves, ledges, thickets, mammal burrows and hollow logs, fallen trees, abandoned hawk or heron nests, and abandoned buildings.	No
Charadrius vociferus	Killdeer	Charadriidae	Nests are simple scrapes on the ground, often placed on slight rises in their open habitats.	No
Corvus branchyrhynchos	American Crow	Corvidae	Crows typically hide their nests in a crotch near the trunk of a tree or on a horizontal branch, generally towards the top third or quarter of the tree.	No
Cyanocitta stelleri	Steller's jay	Corvidae	Nests on horizontal branches close to the trunk and often near the top of the tree, sometimes much lower.	No
Junco hyemalis	Dark-eyed junco	Passerellidae	Nests on the ground in a depression or niche on sloping ground, rock face, or amid the tangled roots of an upturned tree.	No
Leiothlypis celata	Orange-crowned Warbler	Parulidae	Shrubs and low-growing vegetation in riparian settings, patches of forest, and chaparral. Nest on or near the ground.	No
Regulus calendula	Ruby-crowned kinglet	Regulidae	Nests in trees, occasionally as high up as 100 feet, near the tree trunk or suspended from small twigs and branchlets.	No
Sayornis nigricans	Black phoebe	Tyrannidae	Mud nests on vertical walls such as sheltered rock faces, streamside boulders, tree hollows, building eaves, irrigation culverts, and abandoned wells.	No

Animal Species Observed 01/20/21 and 04/14/21 Royal Gold, LLC				
Scientific Name	Common Name	Family	Nesting Habit	Listed?
Sturnus vulgaris	European starling	Sturnidae	Non-native. Starlings typically live around people, using mowed lawns, city streets, and agricultural fields for feeding; and trees, buildings, and other structures for nesting.	No
Tachycineta bicolor	Tree swallow	Hirundinidae	Fields, marshes, shorelines, wooded swamps, and ponds, preferring to live near bodies of water that produce multitudes of flying insects for food. For nesting they need old trees with existing cavities (typically made by a woodpecker), or human-made nest boxes.	No
Turdus migratorius	American robin	Turdidae	Nests on horizontal branches hidden in or just below a layer of dense leaves, typically in the lower half of a tree.	No
Mammals				
Cervus canadensis roosevelti	Roosevelt elk (scat)	Cervidae	Calving occurs in late spring often in open or semi-open areas.	No
Procyon lotor	Racoon (tracks)	Procyonidae	In tree cavities, dens, under buildings.	No
Urocyon cinereoargenteus	Gray fox (tracks)	Canidae	Dens are built in brushy or wooded regions.	No

Eureka, CA | Arcata, CA | Redding, CA | Willits, CA | Fort Bragg, CA | Coos Bay, OR | Klamath Falls, OR

Wetland Mitigation and Monitoring Plan Addendum 1

5.7

Wetland Mitigation and Monitoring Plan

Royal Gold Premium Potting Soils, LLC
Assessor's Parcel Numbers:
516-101-040
516-101-064
516-101-068
516-101-084
Glendale, California

Prepared for:

Royal Gold Premium Potting Soils, LLC

November 2019
016098.006

Reference: 016098.006

Wetland Mitigation and Monitoring Plan

Royal Gold Premium Potting Soils, LLC
Assessor's Parcel Numbers:
516-101-040
516-101-064
516-101-068
516-101-084
Glendale, California

Prepared for:
Royal Gold Premium Potting Soils, LLC

Prepared by:

1062 G Street, Ste. I
Arcata, CA 95521-5800
707-822-5785

November 2019

QA/QC: GCR

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Appendices

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Abbreviations and Acronyms

g/cm^3	grams per cubic centimeter
in.	inch
NTU	nephelometric turbidity unit
SF	square feet
APN	Assessor's Parcel Number
CDFW	California Department of Fish and Wildlife
FAC	facultative wetland plant species
FACW	facultative wet wetland plant species
GPS	global positioning system
MBA	(Wetland) Mitigation (Plan) Baseline Assessment
MDSP	Mitigation Design Site Plan
MMRP	Mitigation, Monitoring, and Reporting Plan
MP#	Mitigation Pit soil analysis location number
NR	no reference
OBL	obligate wetland plant species
Royal Gold	Royal Gold Premium Potting Soils, LLC
SMA	streamside management area
SMAWO	Streamside Management Areas and Wetlands Ordinance (County of Humboldt)
USGS	United States Geological Survey
WS#	Water Sample location number
WMMP	Wetland Mitigation and Monitoring Plan

1.0 Introduction

This wetland mitigation and monitoring plan (WMMP) is submitted by SHN on behalf of Royal Gold Premium Potting Soils, LLC (Royal Gold) and outlines the mitigation, monitoring, and reporting plan (MMRP) for the wetland mitigation project proposed by Royal Gold. The goals of this WMMP are to:

1) develop self-sustaining wetland habitat adjacent to the Royal Gold operation (facility) to mitigate for the loss of wetlands as a result of past and planned development; and
2) stabilize and enhance habitat value and function in an existing wetland area as mitigation for past development.

1.1 Site Location

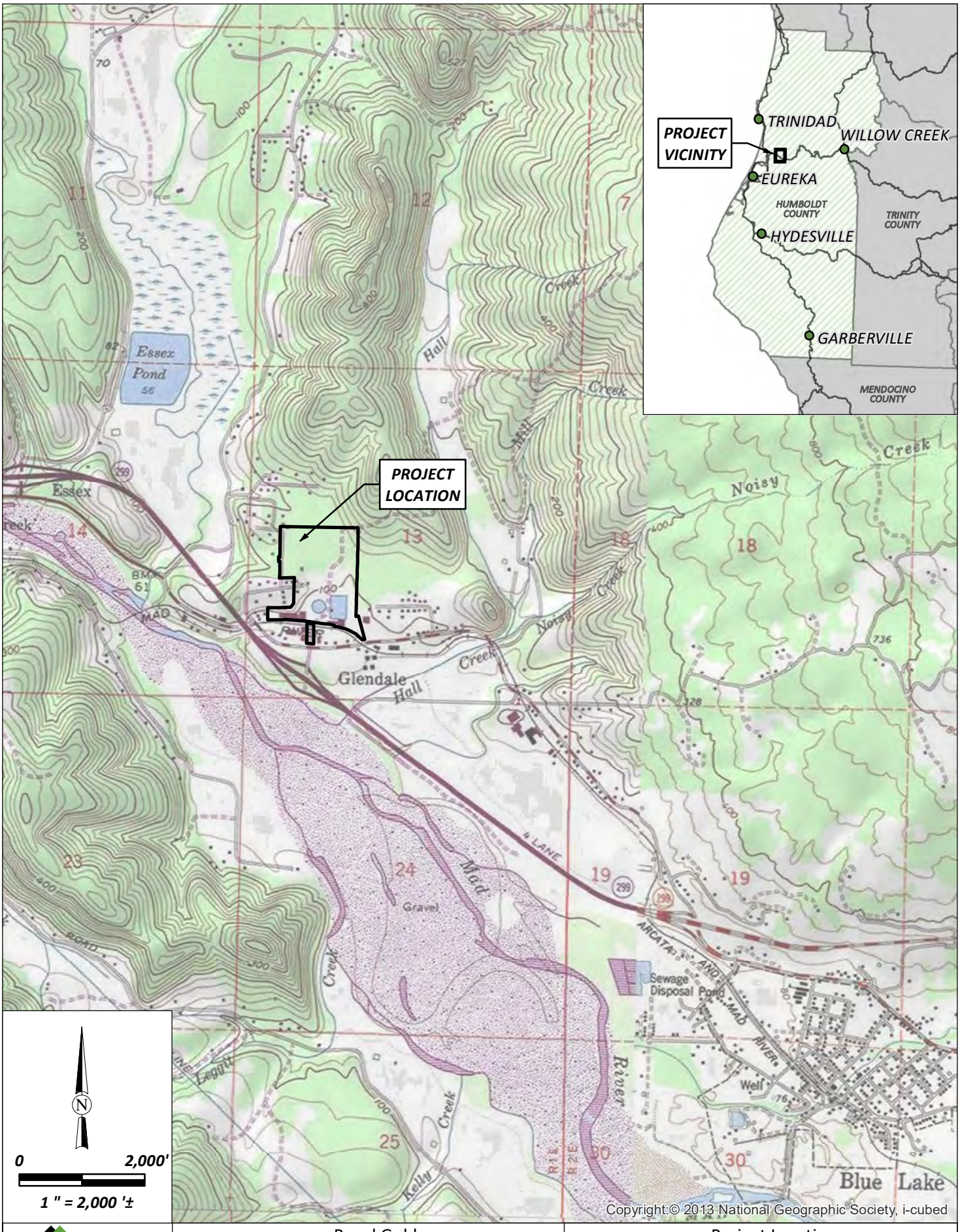
The Royal Gold facility is located in Glendale, California, an unincorporated community within Humboldt County (Figure 1; United States Geological Survey [USGS] Arcata North 7.5-minute Quadrangle, Township 6 North, Range 1 east, Section 13, Humboldt Meridian; USGS, 2012).

For purposes of this WMMP, specific areas are referred to as follows: "Facility" refers to the approximate 15.6-acre operational area where industrial activities associated with soil production and storage occur, primarily in the southern and central areas as seen on the site plan. "Wetland area" refers to the existing wetland outlined in the wetland delineation report, specifically around the northwestern corner of the site. "Wetland mitigation area" refers to the undeveloped upland area adjacent to the northwestern wetland where the proposed mitigation wetlands will be created, as described in Section 1.3 Wetland Delineation. "Impacted wetland area" indicates the filled and enhanced stormwater basin within the central portion of the site, as well as a pond area along the central region of the eastern site border, both of which represent historically impacted wetlands, as outlined in Section 3 Project Mitigation Requirements and Table 1."Site" refers to the entire collection of 15 adjacent parcels, totaling approximately 43.4 acres, much of which is not used for the industrial operation. The site includes the facility, wetland area, mitigation area, and the impacted wetland area.

1.2 Site History

The properties containing the facility have been used for industrial purposes since the 1950s. Two lumber mills operated on the site under different owners until 2002, when the last owner filed for bankruptcy and a large portion of the mill was torn down. Subsequently, a greenwaste recycling and composting company occupied the site. In 2009, the current occupant, Royal Gold, moved to the site to conduct the processing, production, and shipping of their soil products on a small portion of the site. Since 2009, the facility has expanded to encompass more of the southern portion of the site, making use of the structures and concrete pads left from the mill.

Since moving to the site, Royal Gold has made improvements and reestablished the historical industrial footprint that was occupied by the former lumber mills. In doing so, two isolated, historically impacted wetland areas at the site have been converted to stormwater management features or filled. It is also proposed for additional wetland impacts to occur as part of the development of the stormwater system at the site to comply with the Industrial General Permit requirements. This wetland mitigation plan is being proposed to mitigate for these wetland impacts (Figure 2).



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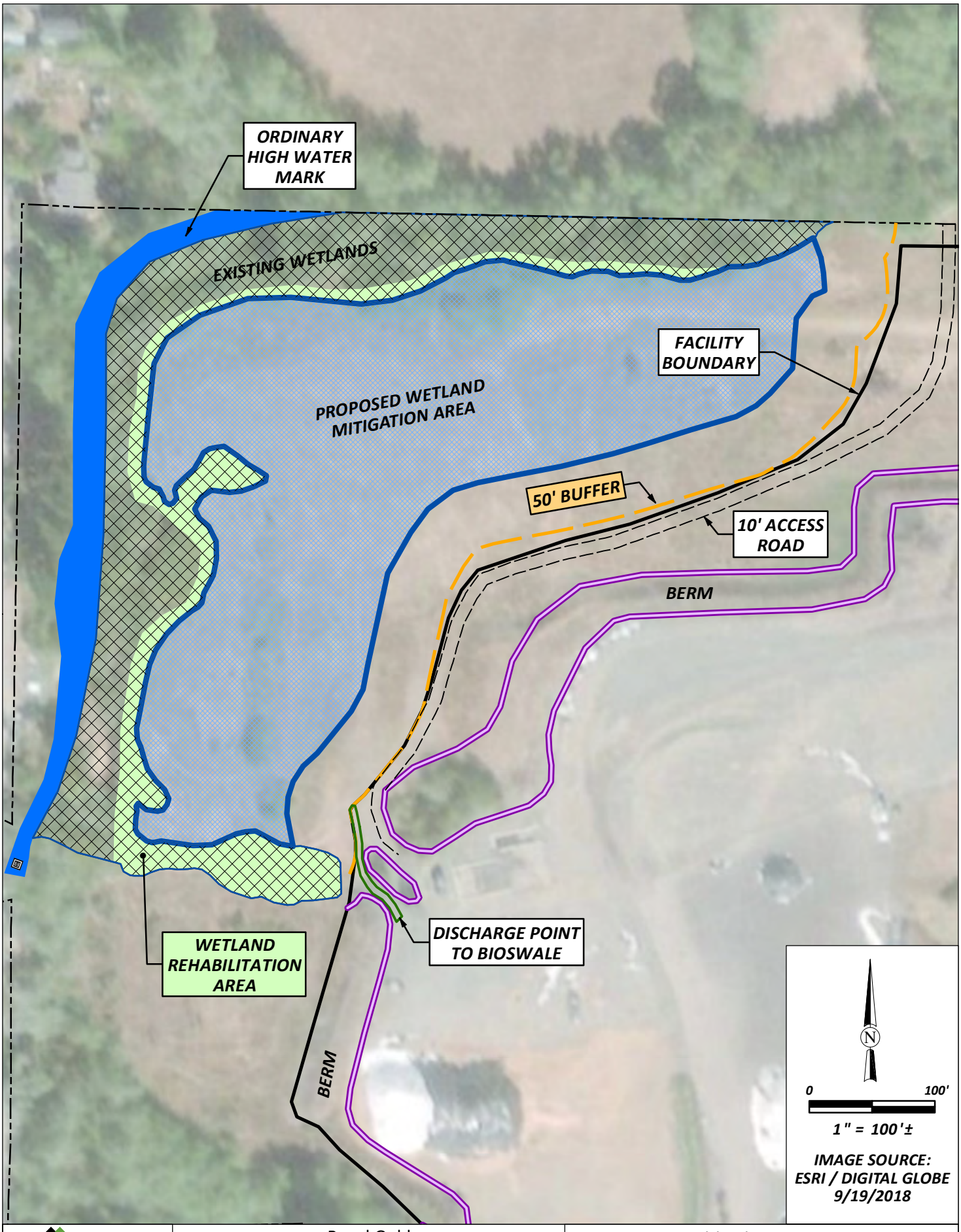
SHN	Royal Gold Wetland Mitigation Plan Glendale, Humboldt County, California	Project Location SHN 016098.006
	September 2019 | WMIT_Fig1_ProjectLocation	Figure 1



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SHN	Royal Gold Wetland Mitigation Plan Glendale, Humboldt County, California	Mitigation Area Map SHN 016098.006
	September 2019 | WMIT2_Fig2_MitigationAreaMap	Figure 2

1.3 Wetland Delineation

A wetland delineation of the Royal Gold site conducted by SHN in 2018 determined that approximately 3.2 acres of three-parameter wetlands and other jurisdictional waters were present within the wetland delineation study area, which included the collection of parcels from Impacted Areas A, B, and C (described in Section 3 Project Mitigation Requirements within the facility, north to the vacant area adjacent to the neighboring property line following the east-west flowing intermittent stream. The wetland delineation study area consisted of six of the parcels on the northern portion of the site (Assessor's parcel numbers [APNs] 516-111-062, 516-101-017, -040, -064, -068, and -084), which total 27.8 acres. The facility sits on approximately 15.6 acres of the site and is the center of operations for Royal Gold. The facility primarily consists of paved surfaces, structures, constructed stormwater features, and storage areas. Due to its developed condition, the remainder of the facility was not included in the wetland delineation study area.

As described in greater detail below, an estimated 1.32 acres of the delineated, historically-impacted wetlands (41%) have been recently impacted, or are proposed to be impacted in the future (see Table 1 for size and location of impacted areas). Impacted areas include the following (Figure 3):

- Two isolated, historically-impacted wetlands in the south-central portion of the wetland delineation project area (Impacted Areas A and B); and
- One historically-impacted wetland in the eastern portion of the wetland delineation project area (Impacted Area C).

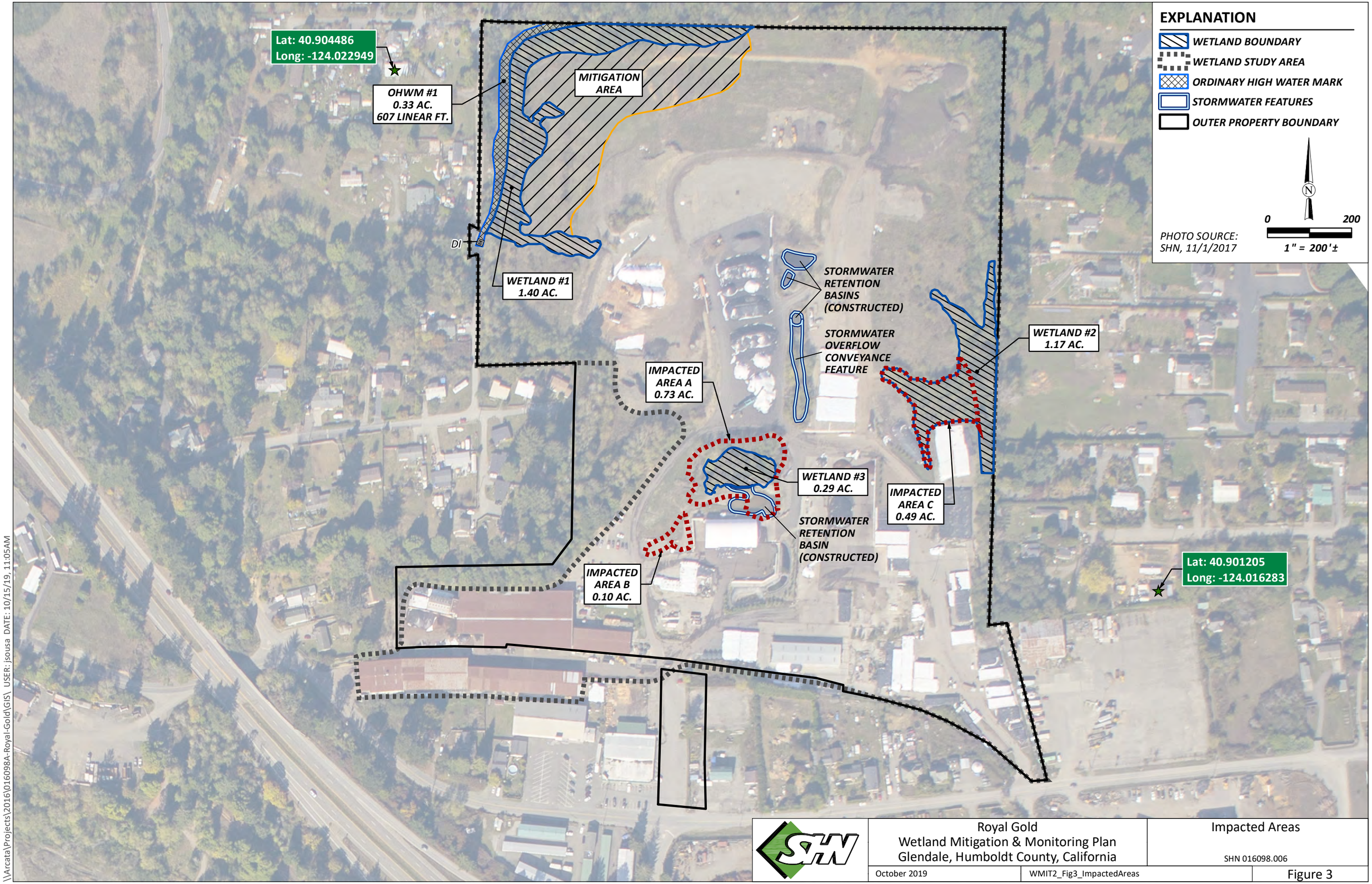
1.4 Wetland Mitigation Area

To mitigate for the impacts to wetlands within the facility, it is proposed to develop a three-parameter wetland mitigation area in the northwestern corner of the site (Figures 2 and 3) at a mitigation ratio of 2:1. It is also proposed to rehabilitate existing, lower quality wetlands adjacent to the mitigation wetland and plant the upland buffer for the mitigation wetland with trees and shrubs. As noted below in Section 1.5, the buffer for seasonal wetlands is 50-feet from the edge of the wetland. These rehabilitation and planting activities are intended to mitigate for the encroachment of industrial activity into the required setback buffers for the drainages and wetlands throughout the facility.

Most of the available mitigation area is vacant and is characterized by a mix of soil piles, bare soil, gravel areas, shrubby areas, and non-native grasslands. The historical use of the site for industrial purposes has ensured the majority of the proposed mitigation area remains in a state of gravelly surface, bare soils, or disturbed grasslands. The site has been continuously manipulated as seen by multiple layers of fill, non-vegetated areas, equipment tracks, and historical aerial photography showing constant change within the project. This area was chosen for the mitigation project because it is adjacent to a seasonal wetland and intermittent stream that will be significantly expanded by the proposed mitigation wetland.

1.5 Humboldt County Wetland Regulations

Wetlands and riparian habitats receive protection under Humboldt County's Streamside Management Areas and Wetlands Ordinance (SMAWO); as defined in Title 3, Division 1, Section 314-61.1 of the Humboldt County Code (County of Humboldt, 2019). Development and work within streamside management areas (SMAs) or wetlands requires a special permit from the County if those activities are not exempt. Both intermittent streams and seasonal wetlands have minimum setback requirements that are defined as extending 50 feet from either side of the stream transition line (measured as the horizontal distance from the top of bank or edge of riparian drip-line whichever is greater) or the edge of the delineated wetland (Appendix 1).



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SHN	Royal Gold Wetland Mitigation & Monitoring Plan Glendale, Humboldt County, California	Impacted Areas SHN 016098.006
	October 2019 | WMIT2_Fig3_ImpactedAreas	Figure 3

2.0 Baseline Assessment

Inadequate physical, chemical, and hydrological soil properties of created mitigation wetlands are the primary cause of relative failure in meeting mitigation goals (Daniels & Whittecar, 2004). Designers often fail to recreate target wetland conditions due to poor or lacking site assessments regarding soils, hydrology, and other environmental factors. Initial site conditions and soil amending practices play a critical role in successful soil and plant community development (Ballantine, et al., 2011). This assessment was performed to increase the potential for meeting mitigation goals by using a well-informed decision-making framework based on localized environmental conditions (SHN, 2019).

2.1 Baseline Discussion

The wetland mitigation area lies at the northwestern corner of the site (Figures 2 and 3). This portion of the site is composed of an open meadow surrounded by a riparian habitat strip to the east, north, and west. The margin of this meadow along the western half of the northern border, wrapping around into the northern portion of the western border, contains a continuous area mapped as wetland during the most recent wetland delineation (SHN, 2018). Within this wetland, there are several areas that remain ponded long enough into the spring season to provide habitat for amphibians and aquatic invertebrates. The riparian strip contains an intermittent stream that flows during the winter months and remains ponded through May. This stream flows at right angles, indicating historical manipulation during previous eras of land use. Soil characteristics indicate fill placement, with observations of abrupt soil boundaries, large woody debris, and anthropogenic materials, including metal and glass during site assessment.

The area within and surrounding the proposed mitigation area was assessed during the winter of 2018-2019 to determine the quality of the wetlands and habitat, to facilitate design and construction, and to evaluate background conditions for setting success criteria. This assessment was compiled in a Wetland Mitigation Plan Baseline Assessment (MBA) (SHN, 2019). Environmental characteristics that were assessed across the MBA study area included soil physical and chemical properties, basic water chemistry, plant species and health, wetland conditions, landform setting, and general landscaping concerns for plant establishment. The latter portion of the assessment occurred as the seasonal wetland areas were drying up so that amphibian and aquatic invertebrate populations could be assessed.

Nine soil pits, designated “mitigation pits” (MPs), were excavated across the MBA study area to assess soil physical, chemical, and hydrological properties as outlined in the MBA. Soil samples were extracted from four of these MPs and submitted for chemical and physical laboratory analysis. Water quality was analyzed at seven water sample (WS) locations, four of which corresponded with MP locations. The assessment locations were chosen to characterize the various types of soils and water features across the MBA study area. These locations are shown on the MBA map in Appendix 2 to illustrate the spatial distribution of the MBA in relation to the proposed wetland mitigation area.

2.2 Water Quality Baseline

Water quality data is presented in the “Mitigation Project Water Quality Assessment” data sheets and laboratory results found in the MBA. Dissolved oxygen was low across the site, ranging from 1.5 to 6.8 milligrams per liter, with an average of 3.47 across the seven WSs that remained ponded into May. Water pH ranged from 5.5 to 7.1, with a true average of 6.03 in the samples below 7 (two samples had a pH of 7.1). Conductivity ranged from 57 to 356 micro Siemens per meter, with an average of 214 across the MBA study area. Turbidity ranged from 15.5 to 61.0 nephelometric turbidity units (NTUs) across the study area, with an average of 29.3. Juvenile frogs and aquatic invertebrates were numerous and diverse in all WS locations except WS5, which maintains enough flow velocity to flush organisms from the narrow channel. Organisms

observed included great diving beetles and larvae, whirligig beetles, water boatmen/backswimmers, caddisfly larvae, damsel flies and larvae, water fleas, fairy shrimp, mosquito larvae, water striders, adult and juvenile tree frogs, adult and juvenile red-legged frogs, and juvenile salamanders. Diving beetle larvae, damsel flies, and juvenile frogs dominated the open-meadow pool wetlands.

2.3 Soils Baseline

Soils varied greatly across the study area, but were very deep throughout. The vicinity around MP1, in the west central portion of the mitigation area, appears to be covered with log deck soil composed of river rock and large amounts of bark, woody debris, and humus. Soils adjacent to the stream are generally clay loam with dark colors indicative of large organic matter volumes. Organic matter was high on most soils with an average of 10%. The exception to this was at MP5 where only two percent organic matter was found. MP5 was characterized by yellow-orange subsoil that was likely placed as fill to level the area for historical industrial use. Surface soil ranging from MP5 (toward the eastern edge of the proposed mitigation area) to the east contains this yellow orange clay loam material. Soil pH averaged 5.27 and ranged from 5.0 to 5.8. Bulk density averaged 0.93 grams per cubic centimeter (g/cm^3) and ranged from 0.83 to 1.12. Macronutrients and zinc were low, while manganese, copper, and boron were generally adequate. Iron was generally tenfold higher than required for plant growth. Soils across the study area were generally loam or sandy loam over clay loam. Additionally, many of the wetland areas within forest canopy contained two to three inches of peat and a dense, fine root mat over the surface. These nutrient-poor clay loam soils, with generally high organic matter concentrations, appear to be ideal for wetland creation.

2.4 Hydrology Baseline

Hydrology across the study area is driven by elevation and soil texture. Soils at approximately 116 feet above sea level are primarily clay loam or muck soils with moderately low to low saturated hydraulic conductivity and moderately well-drained to somewhat poorly-drained soils. These characteristics allow the water table to rise vertically through the soil column during the rainy season, while maintaining low infiltration of precipitation or flood water. As elevation rises to the south, the elevation increase is due to well-drained to moderately well-drained loam or sandy loam fill soils that appear to be historically placed log deck materials. These lumber mill soils elevate the soil surface above the seasonal water table and stream overflow, while allowing precipitation to infiltrate and flow laterally over the clay loam subsurface horizon. Although MP6, MP7, MP8, and MP9 contained too many coarse roots to excavate beyond 12 inches, these locations held standing or flowing water at least 1 foot deep, indicating poor subsurface drainage due to high clay content.

2.5 Wetland Habitat Baseline

Wetland habitat varied across the site, even within the stream channel. Much of the stream channel contains visible microbial iron sheen and orange *Leptothrix* iron deposits. During the April and May assessment, this water was moving very slowly, yet remained six to 12 inches deep. The stream and associated backwaters are represented by WS1, WS2, WS4, and WS5, along with MP6 and MP7. Pool wetlands remaining into the May season included WS3/MP2, WS6/MP8, and WS7/MP9. Short-season pool wetlands comprising the lower pockets within the delineated wetland around the northwestern corner of the study area were represented by MP2, MP3, and MP5.

All wetland areas appear to support amphibians and aquatic invertebrates, while drying up between May and July, which prevents successful bullfrog rearing. The short-season pools dried up by May in the normal 2018-2019 rainfall season, which allowed the early tree frogs and damsel fly larvae to metamorphose, while the frog and insect eggs deposited later in the season died off. Large mats of decayed pollywogs were

observed in the lower depressions of these pools. The greatest variable that appeared to dictate length of ponding was elevation, with lower depressions holding water longer into the season. All soil pits contained clay loam within the bottom of the profile, which creates a seasonal aquitard by slowing water infiltration.

All assessed wetlands contained a minimum of 50% native vegetation. Within the shaded wetlands, areas subject to ponding contained an average of approximately 30% bare area (open water or bare ground). Tree canopy provided shade over all 7 WS locations, as well as over MP6, MP7, MP8, and MP9. The shaded locations exhibited very few invasive, non-native weeds.

3.0 Project Mitigation Requirements

Approximately 3.2 acres, or 139,392 square feet (SF), of wetlands exist on the northern portion of the site (SHN, 2018). An estimated 1.32 acres (57,499 SF) of the wetlands (41%) were historically impacted. These historically-impacted wetlands have since been converted to stormwater features or filled, or are proposed to be converted to stormwater features in the future (see Table 1 for size and location of impacted areas). This includes two isolated wetlands within the central section of the facility (Figure 3). The larger of the two wetlands (Impacted Area A) is currently used as a stormwater feature and totals 31,802 SF, and the smaller of the two wetlands (Impacted Area B) has been filled and planted with native species to form a4,338SF stormwater reduction and infiltration feature. Impacted wetlands include Palustrine emergent persistent seasonally flooded wetland (SHN, 2018). What appears to be a former log pond or settling basin, in the central eastern portion of the property, has developed into wetland habitat since being abandoned. This location (Impacted Area C), encompassing approximately 21,359 SF, lies at a strategic location to intercept and settle stormwater, so it is proposed to become part of the onsite stormwater treatment system to help meet the California State Water Resources Control Board Industrial General Permit pollutant reduction requirements.

Table 1. Wetland Mitigation Area Data
Royal Gold Premium Potting Soils, LLC
Glendale, CA

Impact Area	Surface Area (SF[1])	Mitigation Area Required	Location	Coordinates
A	31,802	63,604	Central	40.901949°, -124.019869°
B	4,338	8,676	Central	40.901671°, -124.020537°
C	21,359	42,718	Central East	40.902309°, -124.018312°
Total	**57,499**	**114,998**	-	-

1. SF: square feet

The project applicant, Royal Gold, is proposing to mitigate wetland impacts at a 2:1 replacement ratio with additional wetland rehabilitation and enhancement on lesser functioning wetlands. Wetlands impacted by the prior activities are estimated as being 36,140 SF. With the additional 21,359 SF of wetlands proposed for incorporation into the stormwater treatment system, a 2:1 replacement ratio would result in the creation of 114,998 SF of wetlands for the three impacted areas. The wetland mitigation area will be contoured and planted with native wetland vegetation to create wetlands of equal or greater value than those being lost as a result of the project. Any wetland mitigation will occur within upland areas to ensure that additional wetland area is not lost. Wetlands created will be of the same type as those lost.

Adjacent to the proposed mitigation wetland, rehabilitation and planting activities within existing wetlands are intended to mitigate for the encroachment of current industrial activity into the required setback buffers for the drainages and wetlands throughout the facility where historical industrial infrastructure exists.

Rehabilitation is proposed to revegetate the lesser functioning wetland on the northwestern portion of the site. These existing wetlands will be enhanced with the removal of non-native vegetation and planting of native hydrophytes.

4.0 Mitigation Goals

The overall goal of this mitigation plan is to compensate for permanent impacts to wetlands and other waters of the United States by improving existing ecological services and functions on wetlands and other jurisdictional waters at the site. Mitigation will be accomplished through a combination of establishment and rehabilitation.

The goals of this mitigation plan are to:

1) mitigate for wetland impacts resulting from the conversion to stormwater features and filling;
2) create wetland habitat outside of active industrial areas and adjacent to an existing wetland complex;
3) improve habitat and function within existing, lower quality wetlands adjacent to the wetland mitigation area;
4) improve water quality in the adjacent waterways by recontouring, planting, and creating habitat on a degraded upland area.; and
5) rehabilitate existing wetlands and plant the upland buffer to mitigate for the drainage and wetland buffer setback reductions throughout the site.

Specifically, wetlands will be created within an upland area on the northwestern portion of the site that is predominantly non-native grassland. Wetland creation will replace impacted wetlands at a 2:1 mitigation ratio, with wetlands of equal or better quality. The designed wetlands will provide habitat within an industrial setting. This would include proper fencing when necessary, vegetation screening, and signage. The mitigation wetland would be situated within an open space area (Figure 2) and would enhance the habitat value of the adjacent wetland area and stream corridor. Existing wetlands on the site currently have high levels of invasive species dominance, and in many places have historical fill placement. Part of the mitigation would include restoration of some existing wetlands adjacent to the mitigation area. This would entail invasive species removal and native plant installation. In addition, existing wetlands would be connected to the proposed mitigation wetlands for habitat connectivity. An invasive vegetation species control program will also be developed as discussed in Section 8.3.

The baseline assessment indicates adequate conditions to support establishment of a mitigation wetland. These conditions are expected to facilitate taxa richness and diversity of amphibians, aquatic invertebrates, and vegetation. The general characteristics observed onsite at the existing wetland areas are included as metrics for informing soil design and long-term water chemistry goals. Basic water characteristics include neutral pH, low dissolved oxygen, low turbidity, somewhat low electrical conductivity, aquatic invertebrates, and juvenile frogs, as outlined in Section 3.2 Water Quality Baseline. Post-project monitoring will measure these parameters to ensure water quality remains close to these reference conditions. Soil chemistry will be somewhat acidic (pH 5.0 to 5.8), with high organic matter, and low nutrient soils with high iron and manganese. The defining characteristic will be elevation low enough to surface the spring water table, and a clay loam substrate to inhibit the rapid infiltration observed in the coarser adjacent soils. Additionally, organic matter should be incorporated within the upper six inches of soil to improve root growth, plant litter-to-soil incorporation, and redoximorphic soil processes.

5.0 Responsible Parties

The following participants are responsible for the installation, maintenance, and monitoring of this mitigation plan. The responsibilities of each party are described below.

5.1 Project Proponent

The project proponent, Royal Gold will be ultimately responsible to ensure that the approved mitigation plan is implemented and successful. Royal Gold will be responsible for financing the preparation, maintenance, and monitoring of the mitigation area.

5.2 Project Biologist

Monitoring of the mitigation area will be the responsibility of a qualified biologist. The project proponent is responsible for retaining the project biologist. The project biologist will coordinate with Royal Gold staff to assist with achieving mitigation goals and performance standards.

After each annual monitoring event, the project biologist will provide Royal Gold with a written list of items in need of attention. The project biologist will be responsible for identifying habitat areas requiring remedial measures and for directing the implementation of such measures.

6.0 Wetland Mitigation and Improvement

Approximately 57,499 SF of wetland habitat is estimated to have been, or will be, impacted by the conversion to stormwater features and filling (Figure 2). This impacted area is characterized as freshwater emergent wetland, as well as freshwater forested/shrub wetland from prior observations by SHN staff and historical aerial imagery (Google Earth, 2018). Dominant tree species throughout the wetland area consisted primarily of arroyo willow (*Salix lasiolepis*). The shrub layer is composed of Himalayan blackberry (*Rubus armeniacus*). Dominant herbaceous species included bur clover (*Medicago polymorpha*), common rush (*Juncus effusus* ssp. *pacificus*), and toad rush (*Juncus bufonius*; Sawyer, 2009; Calflora, 2018; Baldwin et al., 2012). The entire area of impacted wetlands is sloping, however slopes rarely exceeded 5 percent, and were mostly around 2 percent.

Many non-native species were observed within the impacted wetland areas, with varying degrees of dominance. Examples included: creeping buttercup (*Ranunculus repens*), tall fescue (*Festuca arundinacea*), pennyroyal (*Mentha pulegium*), velvet grass (*Holcus lanatus*), Himalayan blackberry, and creeping bentgrass (*Agrostis stolonifera*).

6.1 Wetland Creation and Improvement Plan

The northwestern side of the northern parcel (APN 516-101-040), adjacent to an existing stream corridor and existing wetlands, was determined to be the best location for wetland creation (see Figures 2 and 3). This location was selected for its proximity to the existing wetlands. This proximity to the existing wetlands will allow the created wetlands to be connected to, and incorporated into, the existing wetland area. This will allow for habitat connectivity and will facilitate wildlife movement. Additionally, localized topography will facilitate water movement into the proposed mitigation area without the need for extensive excavation. The proposed location is partially located within a disturbed upland area comprised of fill materials. The proposed wetland mitigation area is large enough to accommodate the 2.64 acres of wetland creation proposed by the project applicant. Lastly, the proposed location will be contiguous with proposed forested open space buffer, and will add to the value of the habitat remaining in the surrounding area.

Currently the proposed mitigation area is characterized as non-native, semi-natural herbaceous grassland. The vegetation is predominantly low-growing, non-native herbaceous plants subject to disturbance. The mitigation area is compacted and flat with limited habitat value. In order to create a viable mitigation area, the compacted soil will have to be tilled to allow the successful growth of trees and shrubs that are specified in this plan.

The proposed mitigation area will need to be graded, and some portions will need to be excavated to create wetland conditions. The mitigation area is primarily flat and will need to be excavated at a slight downward slope from the existing wetland to encourage water movement and retention within the proposed wetland mitigation location. Groundwater levels and soil structure will need to be evaluated after grading, prior to final construction of the wetland mitigation area. The lowest portion of the mitigation wetland needs to retain water for several months at a time, but must drain for some portion of the year to prevent the creation of American bullfrog (*Lithobates catesbeianus*) habitat. Establishing groundwater levels and soil permeability will aid in the design and depth of the mitigation wetland.

The wetland mitigation area will be designed to create wetland habitat that most closely resembles the impacted wetlands. Wetlands that have been, or will be, impacted by the proposed project are sloping between 2 and 5 percent. Wetlands to be created will include sloping areas that will experience various lengths of inundation, as well as relatively flat areas that will be inundated for longer periods (see Figure 2). If it is determined that the pooling depth of the wetland mitigation area is to exceed 1 foot, a 3:1 slope will be excavated to provide a gradual transition for rising water to reach the higher elevations, and to maintain soil stability.

Vegetation will be planted in four distinct zones (Table 2; Appendix 3, Tables 1 and 2). The lowest elevation will encompass approximately 37,949 SF and will have standing water for the longest period. Freshwater emergent wetlands would be created within the low elevation areas to replace freshwater emergent wetlands lost. Species to be planted in this location include obligate (OBL) and facultative wet (FACW) wetland plant species.

Table 2. Wetland Mitigation Planting Zone Data
Royal Gold Premium Potting Soils, LLC
Glendale, CA

Mitigation Zone	Surface Area (SF[1])	Elevation	Trees	Shrubs	Herbs	Total Plants
Freshwater Emergent	37,949	Low	48	436	1,745	2,229
Freshwater Forested Shrub	77,049	Mid	98	1,384	3,544	5,026
Upland Buffer[2, 3]	37,775	High	54	217	0	271
Freshwater Emergent Rehab	19,166	Low	24	220	881	1,125
Total	**171,939**	**-**	**224**	**2,257**	**6,170**	**8,651**

1. SF: square feet
2. Only 50% of area is being planted for a total of 18,888 SF.
3. Herbs should be seeded at a rate of 50 pounds/acre in the upland buffer area.

The mid-elevation zone will be the largest wetland mitigation area encompassing approximately 77,049 SF and will be sloped at 2-5 percent. This zone will drain more quickly, and will mitigate for the freshwater forested/shrub wetland habitat being lost. Species to be installed within this location include FACW and facultative (FAC) wetland plant species.

The planting area above the mid-elevation zone is the 50-foot setback around the east side of the created mitigation wetland, as required in County regulations for seasonal wetlands. This area totals 37,775 SF, with the half of this area closest to the mitigation wetland scheduled for planting, to provide an 18,888 SF strip of trees and shrubs adjacent to the wetland. Since this area is considered upland buffer, it will not count toward wetland creation. This area will be designed primarily for habitat screening to protect the wetland habitat from disturbance. Species appropriate for this location include evergreen upland species planted with appropriate spacing for screening (see Appendix 3, Table 1 for plant numbers and spacing). To guide construction and installation of the mitigation wetland, a wetland mitigation grading and planting plan (planting plan) will be prepared and submitted.

The fourth planting zone is the 19,166-SF wetland rehabilitation area, within the existing low-elevation wetlands immediately west of the mitigation wetland. These poor quality freshwater emergent wetlands will be enhanced with native OBL and FACW wetland plant species.

6.2 Freshwater Emergent (Low Elevation) Wetland Mitigation Area

The lowest elevation will encompass approximately 37,949 SF and will have standing water for the longest period. This area will provide in-kind mitigation for 33% of the wetland habitat impacted at the facility. Species to be planted in this location include OBL and FACW wetland plant species. The design elevation range within this area is 116 to 116.8 feet. Species recommended for planting within the lowest elevation include:

1. Trees: Pacific willow (*Salix lasiandra* var. *lasiandra*), arroyo willow (*Salix lasiolepis*).
2. Shrubs: Douglas spirea (*Spirea douglasii*), salmon berry (*Rubus spectabilis*), red twig dogwood (*Cornus sericea*), and ninebark (*Physocarpus capitatus*).
3. Herbs: common rush, spreading rush *(Juncus patens*), common spikerush (*Eleocharis palustris*), panicled bulrush (*Scirpus microcarpus*), tall flatsedge (*Cyperus eragrostis*), brownhead rush (*Juncus phaeocephalus*), marsh cinquefoil (*Comarum palustre*), water parsley (*Oenanthe sarmentosa*), and arctic sweet colt's foot (*Petasites frigidus* var. *palmatus*).

Freshwater emergent wetland plants should be installed at sufficient densities to facilitate the creation of wetland habitat, and to ensure that vegetation coverage nears 100 percent to prevent the encroachment of invasive species.

1. Trees should be planted at 30-foot centers for a total of **48** trees.
2. Shrubs should be planted at 10-foot centers for a total of **436** shrubs.
3. Herbs should be planted at 5-foot centers for a total of **1,745** herbs.
4. Total plants installed in low elevation wetland: **2,229.**

Plant species will be randomly installed within the freshwater emergent wetland area and are to mimic natural wetland conditions, although care should be taken to maximize vegetation cover, and prevent overcrowding of planted wetland vegetation.

6.3 Freshwater Forested/Shrub (Mid-Elevation) Wetland Mitigation Area

The mid-elevation zone will be the largest wetland mitigation area encompassing approximately 77,049 SF and will be graded with a 2-5 percent slope. This area will drain more quickly, and provide in-kind mitigation

for 67% of the wetland habitat impacted at the facility. Vegetation installed within this location will include FACW and FAC wetland plant species. The design elevation range within this area is 116.8 to 117.5 feet. Species recommended for planting within the mid-elevation wetland mitigation area include:

1. Trees: red alder (*Alnus rubra*), cascara (*Frangula purshiana* ssp. *purshiana*), Oregon ash (*Fraxinus latifolia*), western red cedar (*Thuja plicata*), Sitka spruce (*Picea sitchensis*), Pacific willow, arroyo willow, and Pacific bay (*Umbellulari californica*).
2. Shrubs: California blackberry (*Rubus ursinus*), thimbleberry (*Rubus parviflorus*), red elderberry (*Sambucus racemosa*), mock orange (*Philadelphus lewisii*), twinberry (*Lonicera involucrata* var. *involucrata*), oso berry (*Oemleria cerasiformis*), red twig dogwood, ninebark, and salmon berry.
3. Herbs: arctic sweet colt's foot, blue eyed grass (*Sisyrinchium bellum*), tall flatsedge, common rush, spreading rush (*Juncus patens*), western rush (*Juncus occidentalis*), and lady fern (*Athyrium filix-femina* var. *cyclosorum*).

Freshwater Forested/Shrub wetland plants should be installed at sufficient densities to facilitate the creation of wetland habitat, and to ensure that vegetation coverage nears 100 percent to prevent the encroachment of invasive species.

1. Trees should be planted at 30-foot centers for a total of **98** trees.
2. Shrubs should be planted at 8-foot centers for a total of **1,384** shrubs.
3. Herbs should be planted at 5-foot centers for a total of **3,544** herbs.
4. Total plants installed within sloping wetland: **5,026.**

Conifer species should be planted along the southern edge of wetland mitigation areas at an elevation of 117 to 117.5 feet with willow stakes immediately to the north of the conifer plantings to discourage non-native establishment through shading of the wetland.

Plant species should be randomly planted within the mid-elevation area to mimic natural wetland conditions, although care should be taken to maximize vegetation cover and prevent overcrowding of planted wetland vegetation. Willow staking will be used for the planting of any willows at this location (see Appendix 3, Table 1 for plant numbers and spacing within the freshwater Forested/Shrub wetland mitigation area).

6.4 Upland Buffer Area

The upland buffer area encompasses approximately 37,775 SF and will not count toward wetland creation. The buffer area includes 18,888 SF of tree and shrub plantings. The entire upland buffer area will be planted with herbaceous species through broadcast seeding. This area will be designed primarily for habitat screening to protect the wetland habitat in the mitigation wetland from disturbance. Species appropriate for this location include evergreen upland species planted with appropriate spacing for screening. Species recommended for planting within the upland buffer area include:

1. Trees: Coast redwood (*Sequoia sempervirens*), California Bay (Umbellularia *californica*), Douglas fir (*Pseudotsuga menziesii*), and Sitka spruce.
2. Shrubs: Saskatoon serviceberry (*Amelanchier alnifolia*), coyote brush (*Baccharis pilularis* ssp. *consanguinea*), western hazelnut (*Corylus cornuta*), salal (*Gaultheria shallon*), oceanspray (*Holodiscus discolor*), California wax-myrtle (*Morella californica*), oso berry, and evergreen huckleberry (*Vaccinium ovatum*).

3. Herbs: yarrow (Achillea millefolium), California brome (Bromus carinatus var. carinatus), red fescue (Festuca rubra), and tufted hair grass (Deschampsia cespitosa ssp. cespitosa).

Upland buffer plants should be installed at sufficient densities to create screening for the proposed wetland habitat in the mitigation wetland and to ensure that vegetation coverage nears 100 percent to prevent the encroachment of invasive species.

1. Trees should be planted at 20-foot centers for a total of **54** trees.
2. Shrubs should be planted at 10-foot centers for a total of **217** shrubs.
3. Herbs should be seeded at a rate of **50** pounds/acre.
4. Total plants planted within upland buffer: **271.**

See Appendix 3, Table 1 for plant numbers and spacing within the upland buffer area.

6.5 Existing Freshwater Emergent (Low Elevation) Wetland Rehabilitation Area

The wetland rehabilitation area will encompass approximately 19,166 SF and should have standing water for the longest period. This area currently consists of lesser functioning wetlands and represents one-third of the impacted wetland area. OBL and FACW wetland plant species recommended for planting within this area include:

1. Trees: Pacific willow, arroyo willow.
2. Shrubs: Douglas spirea (*Spirea douglasii*), salmon berry.
3. Herbs: common rush, spreading rush, panicled bulrush, tall flatsedge, slough sedge (*Carex obnupta*), brownhead rush (*Juncus phaeocephalus*), and arctic sweet colt's foot.

Freshwater emergent wetland plants should be planted at sufficient densities to facilitate the creation of wetland habitat and to ensure that vegetation coverage nears 100 percent to prevent the encroachment of invasive species.

1. Trees should be planted at 30-foot centers for a total of **24** trees.
2. Shrubs should be planted at 10-foot centers for a total of **220** shrubs.
3. Herbs should be planted at 5-foot centers for a total of **881** herbs.
4. Total plants installed in low elevation wetland: **1,125.**

Plant species would be randomly installed within the existing freshwater emergent wetland area to mimic natural wetland conditions, although care should be taken to maximize vegetation cover and prevent overcrowding of planted wetland vegetation.

6.6 Soil Specifications

Based on the results obtained from onsite reference wetlands, as compared to adjacent uplands proposed as wetland mitigation areas, the primary action required to create favorable wetland soil conditions will be to excavate the loamy surface soils down to the clay loam or sandy clay loam at or below approximately 116 feet in elevation. Despite the variability in surface soil physical characteristics, all four soil types sampled maintain very similar chemical properties. Given that pools within the reference wetlands appear to be thriving on the different soil types, very little amendment work is required. No fertilizers or structural amendments are recommended. Because soil disturbance will induce organic matter oxidation, and because the mature riparian wetlands commonly contain an approximate 3-inch surface peat horizon, organic

material has been applied to the proposed mitigation area to begin building the topsoil organic composition, which will simulate this peat horizon. Additionally, this organic incorporation will help reduce initial weed competition, will hold moisture in the soil surface root zone, will reduce soil temperatures during plant establishment, and will prevent erosion. Any exposed soil areas lacking organic matter after final grading, as indicated by bright orange color or compacted surfaces, will be over-excavated by several inches and have a lift of salvaged topsoil applied, or will receive a layer of organic material, which will be thoroughly incorporated into the soil surface.

A pre-planting weed control regime is recommended for upland or facultative areas that will be excavated 6 inches or less. This regime will include excavation to grade, followed by lightly disking and then watering the soil. Within several weeks of weed germination, the area will be disked and re-watered to destroy emerged seedlings and cycle the next batch of weed seeds. Three weed germination-disk cycles are recommended to decrease weed competition.

6.7 Habitat Establishment

The existing berm on the northern section of the property will be used as a wildlife-friendly barrier. Because the wetland mitigation area is removed from the operations at the facility, the remote location and existing berm are expected to deter foot or vehicle traffic that could interfere with the establishment of planting areas (Figures 2 and 3). Additional temporary fencing should be considered around trees and shrubs during the plant establishment period if vegetation shows high levels of herbivory. Such fencing could include Vexar tree tubes around individual trees, or deer netting around tree and shrub clusters.

Once the newly planted vegetation begins to establish, structural complexity within the mitigation area will increase, allowing for the development of a mosaic of native vegetation that will support diverse assemblages of plant and animal communities. Mitigation monitoring will record the success of habitat development within the mitigation areas.

6.8 Final Design Site Plan

Upon approval of this WMMP by the County of Humboldt and state and federal agencies with jurisdictional authority, the final planting plan will be drawn according to the concepts and guidance provided within this document. The planting plan will guide construction and installation of the earth shaping activities, habitat features, and plant communities within the four planting zones outlined in this WMMP. Appendix 4 includes three planting detail examples to demonstrate some of the general planting techniques that will be employed. The planting plan will be submitted to the permitting agencies for final approval.

7.0 Monitoring and Reporting Program

7.1 Performance Standards

Success of the mitigation plan is defined as creating in-kind wetland habitat to mitigate for a loss of wetlands resulting from past and proposed improvements at the facility. A total of 114,998 SF of in-kind wetland habitat will be created and planted with native wetland vegetation species. Success of the plan is also defined as rehabilitating 19,166 SF of existing, lower quality wetlands adjacent to the mitigation wetland and planting 18,888 SF of the upland buffer for the mitigation wetland with trees and shrubs. These rehabilitation and planting activities are intended to mitigate for the encroachment of industrial activity into the required setback buffers for the drainages and wetlands throughout the facility due to the historical installation of pavement, curbs, and infrastructure within these areas. The success of the wetland mitigation planting areas may be achieved with a combination of success criteria that includes:

- A minimum of 114,998 SF of wetlands are created;
- 75 percent survival of planted trees, shrubs, and herbaceous plants (including wild recruitment of native species) within the created wetlands;
- 75 percent survival of planted trees, shrubs, and herbaceous plants (including wild recruitment of native species) within the upland buffer;
- live vegetation throughout all revegetated area (some minor gaps are expected);
- invasive species are removed and reduced within existing wetland rehabilitation areas and are discouraged from becoming established within the new wetland and upland planting areas;
- revegetation plants are not substantially suppressed from herbivory, competition from weeds, or encroachment by humans; and
- supplemental irrigation or replacement plantings have not been needed in the preceding growing season to meet the 75 percent survival threshold.

7.2 Monitoring and Reporting Program

As part of the monitoring program both quantitative and qualitative (visual assessment) sampling will be performed by a qualified biologist. This assessment will be used to make maintenance recommendations in annual reports, which will evaluate the success of the mitigation plan. An "as planted" report will be produced after grading and planting to verify which species were planted and where. This will be created immediately after planting and will be used to assess the success target for percent survival. It will also aid in future monitoring as vegetation grows and site conditions change. Any change in the number of plants and species installed will be recorded within the "as planted" report and will be approved by the project biologist prior to planting. Vegetation monitoring shall be conducted at the mitigation area for a minimum of three years or a total of five years if success criteria are not met within the first three years of monitoring. If the success of tree plantings falls below 75 percent survival within the monitoring period, replanting will occur to ensure the success criteria is met. If replanting occurs within the fifth year of monitoring to meet the 75 percent threshold, the 3-5-year monitoring cycle will start over.

7.2.1 Quantitative Sampling

Quantitative comparative vegetation data will be collected annually in the late spring/early summer, although some flexibility in the monitoring schedule is acceptable to account for seasonal variation in weather conditions. The large area to be monitored, and the high number of plants to be installed, prohibits the use of direct count methods, and necessitates the use of random sampling to estimate vegetative cover and survival.

Results will determine if plant cover and survival meet the prescribed success criteria, as described above in Section 7.1 Performance Standards. Monitoring results will be compiled into annual reports and submitted at the end of each year of monitoring. Monitoring reports, including an evaluation of success, are due annually by December 31 and will be submitted to California Department of Fish and Wildlife (CDFW), the County of Humboldt, and other applicable agencies with jurisdictional authority.

Absolute percent cover of native and non-native plant species will be collected from randomly placed quadrats within the mitigation area from which cover and survival percentages of installed vegetation will be calculated and used for statistical comparison. Quadrat methods will be used to estimate absolute vegetative cover, native cover, hydrophytic vegetation cover, and non-native vegetation cover. Monitoring

will be used to determine if mitigation areas are meeting set success criteria for vegetative cover and survival. Methods should remain consistent throughout the monitoring period.

7.2.1.1 Vegetation Monitoring Methodology

Absolute percent cover of native and non-native plant species will be collected from randomly-placed quadrats within each wetland type and mitigation area. Mitigation monitoring will be divided into four areas called macroplots: freshwater emergent wetland (low elevation), freshwater forested/shrub wetland (mid elevation), rehabilitation freshwater emergent wetland, and upland buffer (see Figure 2). These macroplots will define the boundaries of the populations to be sampled. Sampling locations will be established within these areas during the first growing season, and the same locations will be used for each year of monitoring. The establishment of permanent monitoring polygons within similar habitat types allows for a direct qualitative comparison annually for tracking trends in vegetation changes and developing remedial recommendations, if necessary.

Within each monitoring macroplot area, a simple random coordinate method will be used to sample mitigation areas. Baselines, X and Y axes, will be oriented within the wetlands with the X-axis running the longitudinal length of the wetland and the Y-axis running latitudinally. These transects will provide the base from which random monitoring plots will be generated by using random number generator software. For each sampling plot, a random value will be chosen for the X-axis and a random number will be generated for the Y-axis. The point at which these intersect specifies the location of the sampling quadrat. Coordinates that fall out of the macroplot area will be rejected.

Each macroplot will have a permanent monument placed using wood or metal stakes for ease of reestablishing the location of the macroplot and X and Y axes in future monitoring efforts. Each monument should be labeled and located using a sub-meter global positioning system (GPS), and photos taken at each monument at the conclusion of monitoring to aid in finding the monument in future monitoring efforts.

The number of sampling points required to adequately evaluate the percent cover within the mitigation area will be developed following completion of the planting, and establishment of the monitoring points, and will be included within the “as planted” report.

7.2.2 Qualitative Visual Assessment

During each monitoring event, visual observations of habitat conditions will be noted. The qualitative visual assessment will be the primary tool by which habitat development is evaluated, and the need for any remedial measures is identified. The assessment will determine if data from sampling transects is an accurate representation of mitigation area conditions. Qualitative visual assessment will help assess the overall functioning of the mitigation area as a whole and will help to identify localized or low-level trends (such as, new invasive species encroachment, localized changes in species abundance, and other changes that might be overlooked if only transect monitoring is used).

Particular attention will be paid to the following:

- native species recruitment and habitat development in the wetland mitigation, wetland rehabilitation, and upland buffer areas;
- evidence of viable plant reproduction in the wetland mitigation area;
- the presence of birds and other wildlife in the mitigation area;
- introduction and infestation of exotic species; species encroachment and spread will be recorded;

- erosion within the mitigation, rehabilitation, or buffer areas; and
- evidence of continued herbivory or human encroachment into the mitigation area.

7.3 Photo Documentation

In addition to the general qualitative assessment and transect sampling, several permanent stations for photo documentation will be established in the mitigation area. Photos will be taken prior to implementation of the mitigation plan and will be included as part of each annual monitoring report. Photo stations will be established during the first site visit, and the locations will be recorded in the "as planted" report, to be used in each successive monitoring report. Photos will include direction of view, and a reference to the photo monitoring location.

7.4 Annual Reports

An "as planted" report will be produced after grading and planting to verify which species were planted and where. This will be created immediately after plant installation and will be used to assess the success target for survival percentage. It will also aid in future monitoring as vegetation grows and site conditions change. Any change in the number of plants and species planted will be recorded within the "as planted" report and will be approved by the project biologist prior to planting. Vegetation monitoring shall be conducted at the mitigation area for a minimum of three years or a total of five years if success criteria are not met within the first three years of monitoring. The first annual monitoring event will occur one year following plant installation. Recommendations for any corrective action necessary to ensure the continued success of the mitigation plan will be included in the report, as well as results from the quantitative and qualitative monitoring.

8.0 Maintenance Plan

8.1 Schedule

The mitigation plan is proposed to be implemented to compensate for wetland impacts associated with prior and proposed improvements to the facility and for the encroachment of industrial activity into drainage and wetland setback buffers throughout the facility. The timeline for implementation of the mitigation plan is dependent on several factors including, but not limited to, property owner authorization, agency permitting, recording of a deed restriction for the mitigation area and buffer, and seasonal constraints. At this stage in the process of developing the mitigation plan, Royal Gold has received authorization from the property owner to construct and maintain the mitigation area and record a deed restriction over the parcels that will contain the mitigation wetland and buffer. Permits for the proposed mitigation plan will be required from the County of Humboldt, Army Corps of Engineers, Regional Water Quality Control Board, and California Department of Fish & Wildlife. Permit applications will be submitted to these agencies after they provide conceptual approval of the mitigation plan. Receiving these permits typically takes between 3 to 6 months. Upon receipt of the permits, the deed restriction will be drafted, reviewed by the County, and recorded. In addition, timing of mitigation work should also take the following seasons into account:

- Vegetation removal and other ground-disturbing activities associated with any construction or mitigation activities should occur between August 16 and February 28 when birds are not typically nesting. If vegetation removal or ground-disturbing activity is to occur during the nesting season (March 1 to August 15 for most birds), a qualified biologist shall conduct a pre-construction nesting bird survey. Pre-construction surveys for nesting pairs, nests, and eggs shall occur within the

construction limits and within 100 feet (200 feet for raptors) of the construction limits. If active nests are encountered, species-specific measures shall be prepared by a qualified biologist in consultation with CDFW, and implemented to prevent abandonment of the active nest.

- Project activities in areas near riparian and seasonally wet areas that provide amphibian habitat shall occur from July 15 to October 31, to minimize potential impacts to these species. Work in these areas may extend beyond October 31 in the event the wet season commences later in the season. However, work in seasonally wet areas shall cease once precipitation accumulates within such areas.
- Maintenance will be conducted as necessary to meet final performance standards, and will be conducted based on the findings and recommendations contained within the monitoring reports. As native habitat develops within the mitigation area, the need for maintenance activities (for example, watering and weed control) should decrease.

8.2 Initial Maintenance

Initial maintenance is considered to be work performed during the 3-5-year monitoring period.

Weed eradication will be conducted as necessary to minimize competition that could prevent the establishment of native species within the mitigation area. Invasive species shall be removed by hand, manual means, or methods deemed appropriate by a qualified biologist or restorationist.

Planting areas may need protection by fencing or protective barriers to prevent herbivory and trampling. If the mitigation area is showing evidence of human encroachment, additional fencing and/or signage shall be installed to prevent further disturbance of the mitigation areas. Additional woody debris or plants can be installed within encroachment areas to deter people from entering the mitigation areas.

If the success of tree plantings falls below 75 percent survival within the monitoring period, replanting will occur to ensure the success criteria is met. Replanting will be seasonally appropriate and will consist of planting the same species that died and are being replaced. If replanting occurs within the fifth year of monitoring to meet the 75 percent threshold, the 3-5-year monitoring cycle will start over.

Replanting cannot occur for the last two years of monitoring to achieve success.

In order to ensure 75 percent survival of the revegetation plants, it is recommended that summer watering occur at least within the first summer/fall after the initial planting. This has been shown to increase the likelihood of survival greatly, especially in drier areas where there is currently no habitat value. It is recommended that watering occur monthly during the dry season of the first year after installation, between July and the first soaking rains. A similar pattern should be followed for replacement plantings installed during the second year. Watering cannot occur during the last year of monitoring, because the revegetation plants must be self-sustaining.

As part of the maintenance program, erosion and slope stability will be monitored and maintained. This will include noting any new erosional feature, and reporting any new erosion within the sloping mitigation areas. Erosion maintenance will be conducted by the project proponent, and any large-scale erosion control or repair will be the responsibility of the project proponent during the years of monitoring.

8.3 Invasive Species Prevention and Management

Invasive vegetation species prevention and management is central to the success of this mitigation plan. Encroachment of invasive plant species into mitigation areas will limit the potential habitat value of these features, and can limit the success of plantings through direct competition.

Invasive vegetation species observed within the existing wetlands and throughout the site that may become established within the mitigation areas include the following (California Invasive Plant Council, 2018):

- English holly (*Ilex aquifolium*)
- cotoneaster species (*Cotoneaster* sp.)
- French broom (*Genista monspessulana*)
- Spanish heather (*Erica lusitanica*)
- hardy fuchsia (*Fuchsia magellanica*)
- Scotch broom (*Cytisus scoparius*)
- English ivy (*Hedera helix*)
- Himalayan blackberry (*Rubus armeniacus*)
- crocosmia (*Crocosmia* X *crocosmiiflora*)
- poison hemlock (*Conium maculatum*)
- pampas grass (*Cortaderia jubata*)
- creeping bentgrass (*Agrostis stolonifera*)
- pennyroyal (*Mentha pulegium*)
- tall fescue (*Festuca arundinacea*)
- creeping buttercup (*Ranunculus repens*)
- reed canary grass (*Phalaris arundinacea*)
- western manna grass (*Glyceria x occidentalis*)

It should be noted that the list of target invasive species may change as soil is moved and equipment is used in construction of the project, which may introduce seeds from other invasive species not currently onsite. Changing conditions on adjacent sites could also introduce wind-borne weed seed.

A dense planting pattern will ensure that native vegetation is well established up front within the mitigation areas. This will give native vegetation the ability to outcompete invasive vegetation within the mitigation areas. A monitoring and maintenance plan should be developed following the installation of plantings, detailing the monitoring and removal of invasive species. The mitigation areas should be monitored and maintained to prevent the establishment of invasive species during the first 3 to 5 years of establishment. Monitoring will include noting invasive species occurrences and will suggest methods for removal if the occurrence is too large to address by the monitor. Monitoring reports will document invasive species establishment and ongoing removal during the monitoring period.

Invasive amphibian species (such as, the American bullfrog) are leading to the decline of native amphibians. Poorly designed wetland mitigation areas are creating additional habitat for this species. The wetland will be designed to dry out toward the end of the dry season, typically in August. This dry period will be achieved through natural evapotranspiration and seasonal water table recession. The low saturated hydraulic conductivity across the mitigation area is ideal to hold water into late spring, while providing a dry period in the summer. Juvenile native amphibians are adapted to this hydrologic cycle, while the invasive bullfrogs will not have time to metamorphose and become established. To achieve this ideal hydrologic cycle, the wetland mitigation areas will be constructed at the elevations described in Section 6 of this plan. These elevations were surveyed during the wet season to characterize the existing natural wetlands and

their associated ideal hydrologic cycle. The lowest elevation of the ponded wetland areas was 116 feet above sea level. This elevation has been set as the standard low point for the freshwater emergent wetland mitigation area to ensure this ideal dry season timing is met. Drying of the wetland will allow native amphibians to breed successfully, while preventing the establishment of American bullfrogs, which require perennial stagnant waters (Fuller, 2010).

8.4 Adaptive Management Maintenance

The adaptive management maintenance is proposed to ensure the successful establishment and persistence of habitat within the mitigation area. This maintenance allows flexibility for the inherent changes and instability experienced in natural habitats and the ecological processes that define them. Adaptive management allows the results and observations of the monitoring visits to drive the maintenance plan and the solutions to problems that may arise. This allows the project proponent and project biologist to learn by experience within site-specific environments, and apply solutions to remedy deficiencies using a controlled and scientific approach.

Adaptive management procedures will be recommended on a case-by-case basis and will be described within the annual monitoring reports. Adaptive management actions would include, but are not limited to, the following:

- Adjust weeding methods to reduce weeds around the mitigation area to decrease competition from non-native grasses and forbs. This includes adjusting the timing of removal and the methods of removal dependant on the species encountered.
- Include supplemental planting in areas that have deficiencies in the planted material.
- Include supplemental replacement of species (may be in-kind, or if a specific species is not successful within a particular area, a suitable species can be used to replace the original plant species).
- Conduct supplemental watering (for plants doing poorly, or supplemental plantings).
- Conduct additional herbivore control.
- Conduct additional erosion control.

Unpredictable natural conditions could potentially alter the mitigation area and necessitate changing the goals, objectives, strategies, and actions set forth in this plan. Unpredictable natural conditions that could impact the mitigation area include:

- Unusual weather patterns (such as, extended drought, or excessive rainfall)
- Changes in plant compositions (such as, introduction of a new, non-native invasive plant or wildlife species to the site)
- Erosion or deposition of sediments
- Excessive human encroachment or disturbance of the mitigation area

If any change is deemed necessary to achieve the successful creation of wetlands and planting of the mitigation area, the project biologist shall meet with the project proponent to revise the adaptive management plan. Any change will be recorded within the annual monitoring reports submitted to the applicable agencies with jurisdictional authority.

9.0 Completion of Mitigation

The project proponent will notify the County of Humboldt, CDFW, and other applicable agencies with jurisdictional authority upon completion of the 3- or 5-year mitigation monitoring program through the submittal of a final monitoring report. If the project meets performance standards at the end of the 3-year monitoring period, the mitigation will be considered a success; if not, problems will be evaluated and further addressed. At this point, the maintenance and monitoring program will be extended to 5 years of monitoring. Note that if replanting occurs within the fifth year of monitoring to meet the 75 percent threshold, the 3-5-year monitoring cycle will start over. Monitoring extensions will be done only for areas that fail to meet final success criteria. This process will continue until all standards are met. If the mitigation effort meets all goals prior to the end of the 3-year monitoring period, the County of Humboldt, CDFW, and other applicable agencies with jurisdictional authority may terminate the monitoring effort at their discretion.

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Soil and Groundwater Management Plan

5.8

Soil and Groundwater Management Plan

Royal Gold, LLC
1689 Glendale Drive
Glendale, California

Prepared for:

Royal Gold, LLC

October 2021

016098.003

Phone: (707) 441-8855 **Email:** info@shn-engr.com
Web: shn-engr.com • 812 W. Wabash Ave. Eureka, CA 95501-2138

Phone: (707) 441-8855 Email: info@shn-engr.com Web: shn-engr.com
812 W. Wabash Avenue, Eureka, CA 95501-2138

Reference: 016098.003

October 7, 2021

Chad Waters
Royal Gold, LLC
600 F Street, Suite #3
Arcata, CA 95521

Subject: Soil and Groundwater Management Plan, Royal Gold, LLC at 1689 Glendale Drive, Glendale, California

Dear Chad Waters:

SHN has prepared this soil and groundwater management plan (SGMP) for the Royal Gold facility located at 1689 Glendale Drive in Glendale, California. Royal Gold, LLC is completing this SGMP in support of its Humboldt County Planning and Building Department Conditional Use Permit and Special Permit, and in anticipation of potential future site development and operations. This SGMP provides recommended guidance for the management of potential chlorinated solvents, pentachlorophenol, tetrachlorophenol, dioxins/furans, volatile organic compounds, or petroleum hydrocarbons in soil and/or groundwater at the site.

Sincerely,

SHN

Roland Rueber, PG

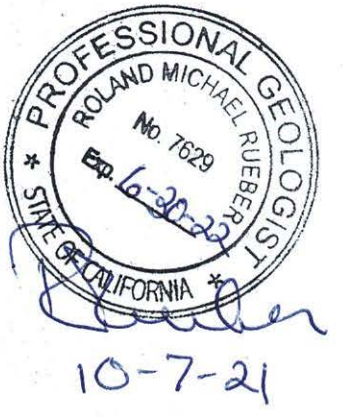
RMR/MLC:ame

Enclosure: Report

Soil and Groundwater Management Plan

Royal Gold, LLC at 1689 Glendale Drive, Glendale, California

Prepared for:
Royal Gold, LLC



Prepared by:

812 W. Wabash Ave.
Eureka, CA 95501-2138
(707) 441-8855

October 2021

QA/QC: RMR

Reference: 016098.003

Table of Contents

List of Illustrations

Abbreviations and Acronyms

Units of Measure

µg/L	microgram per liter
mg/kg	milligram per kilogram

Additional Terms

BGS	below ground surface
BLFP	Blue Lake Forest Products, Inc.,
CFR	Code of Federal Regulations
DHS	Department of Health Services
DTSC	California Department of Toxic Substances Control
EB-#	boring-number
Envirostor	DTSC website
EPA	U.S. Environmental Protection Agency
LUC	Land Use Covenant
M&P	McNamara & Peepe
MW-#	monitoring well-number
NR	no reference
O&M	operation and maintenance
PCP	pentachlorophenol
PSCs	potential site contaminants
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RAP	remedial action plan
Royal Gold	Royal Gold, LLC
SGMP	soil and groundwater management plan
TCP	tetrachlorophenol
the Cap	concrete protective cover over the former green chain
TPH	total petroleum hydrocarbons
USGS	United States Geological Survey
VOCs	volatile organic compounds

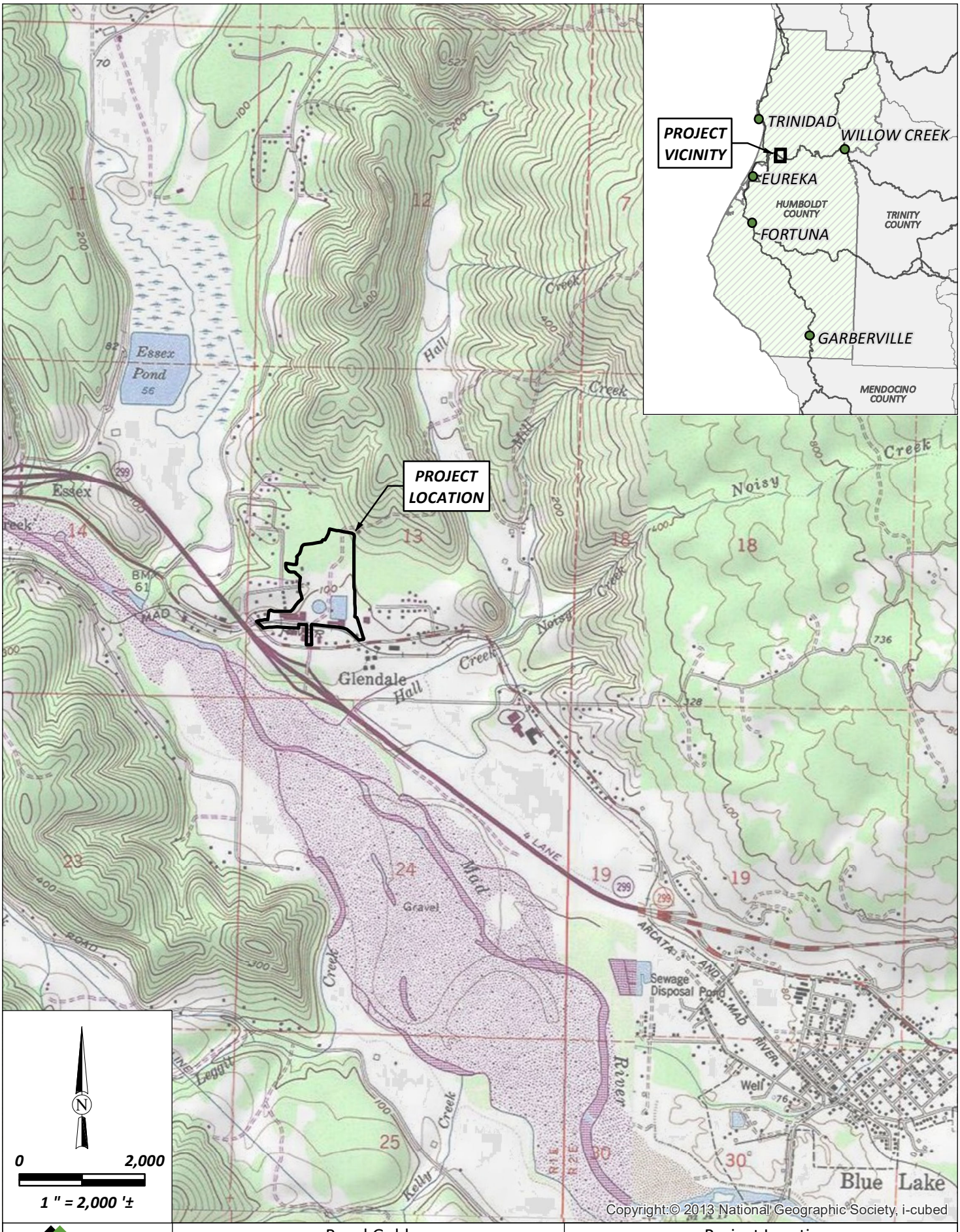
1.0 Introduction

SHN developed this soil and groundwater management plan (SGMP) for the Royal Gold facility located at 1689 Glendale Drive in Glendale, California (Figure 1). Royal Gold, LLC (Royal Gold) is completing this SGMP in support of its Humboldt County Planning & Building Department Conditional Use Permit and Special Permit and in anticipation of potential future site development and operations. This soil and groundwater management plan provides recommended guidance for the management of soil and groundwater potentially impacted by chlorinated solvents, pentachlorophenol (PCP) and tetrachlorophenol (TCP), dioxins/furans, volatile organic compounds (VOCs), or petroleum hydrocarbons that may be encountered during proposed construction activities. This list of chemicals is referred to as potential site contaminants (PSCs) in the remainder of this plan.

This SGMP addresses recommendations for characterization of soil and groundwater impacted by PSCs prior to proposed construction activities for worker safety, potential onsite reuse or offsite disposal, and management of excavated material at the property. This SGMP provides recommended guidance to protect site construction workers, the public, and the environment from PSCs in soil and/or groundwater encountered during site activities. This SGMP includes recommended actions to address handling, onsite reuse, and offsite disposal of contaminated soil and/or groundwater, if necessary. The objective of the SGMP is to ensure that no significant impacts occur to nearby sensitive receptors, aquatic species, and water resources. A site plan showing the proposed buildout of the Royal Gold facility is included as Figure 2.

Royal Gold is proposing several new buildings, additional utility infrastructure, and other related improvements to accommodate the needs of its growing business. These improvements are shown as proposed on Figure 2 and include the following:

- Paving: Paving of areas in the northern portion of the site is proposed to improve site access and stormwater management, minimize fugitive dust, and address concerns about disturbing onsite soils.
- Electric utility infrastructure: Installation of electric utility infrastructure is proposed to serve the new buildings at the site.
- Building C: Construction of an approximately 14,000-square-foot (200-foot by 70-foot) building directly south of Building A and associated utility infrastructure (for example, electricity, water, and so on) is proposed. This building would be a pole-shed-style metal building. Proposed Building C would be located on parcel 516-101-084 (APNs are shown on Figure 3).
- Building D: Construction of an approximately 30,000-square-foot (100-foot by 300-foot) building in the northern central portion of the site and associated utility infrastructure (for example, electricity, water, and so on) is proposed. This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it is located on a portion of APN 516-111-062.
- Building E: Construction of an approximately 42,500-square-foot (250-foot by 170-foot) building and associated utility infrastructure (for example, electricity, water, and so on) in the central portion of the site in the area currently used as the bulk soil yard is proposed. This building would be a pole-shed-style metal building. Based on the proposed location of the building, it appears that it is located on a portion of APN 516-111-062.



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SHN	Royal Gold Soil & Groundwater Management Plan Glendale Dr., Humboldt County, California	Project Location SHN 016098
	August 2021 | SGMP_Fig1_ProjectLocation	Figure 1

EXPLANATION

- EXISTING MONITORING WELL (LOCATIONS ARE APPROXIMATE, INSTALLED BY OTHERS)
- WATER TANKS
- BERM
- BUILDINGS - EXISTING
- BUILDINGS - PROPOSED
- CONCRETE CAP AREA
- NO GROUND DISTURBANCE AREA
- PROPOSED PAVING
- FACILITY BOUNDARY
- <E> EXISITING
- <P> PROPOSED

N

0 200

1 " = 200 '±

PHOTO SOURCE: GOOGLE EARTH, 4/30/2019

<P> WETLAND MITIGATION AREA

BERM

BERM

BERM

BERM TO BE REMOVED

<P> DRAINAGE SWALE

FACILITY BOUNDARY

<P> BUILDING D 300' X 100'

<P> DETENTION BASIN

<P> BUILDING E 250' X 170'

<P> CHIP PIT 42' X 25'

<P> BUILDING C 200' X 120'

MW-7

MW-9

MW-8

CONCRETE CAP

CONCRETE CAP

NO GROUND DISTURB-ANCE

MW-5

MW-1

MW-12

MW-13

MW-14

MW-11

MW-10

FORMER GREEN CHAIN AREA SUBJECT TO LAND USE COVENANT

FORMER SAWMILL AREA

<P> BUILDING F 50' X 50'

ENTRANCE / EXIT

HIGHWAY 299

GLENDALE DR. (CO. RD. #4L765)

MAD RIVER

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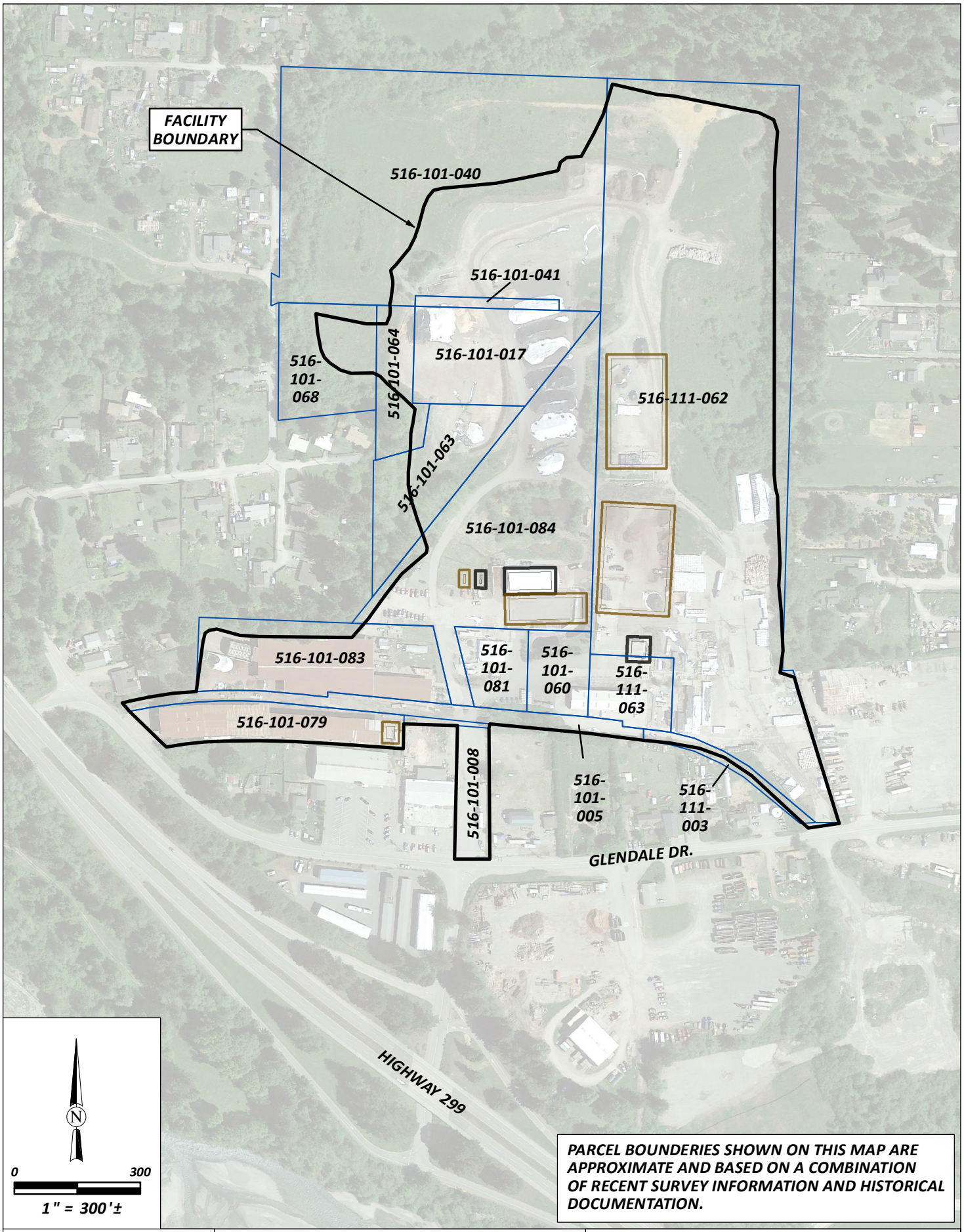
SHN	Royal Gold Soil & Groundwater Management Plan Glendale Dr., Humboldt County, California	Soil & Groundwater Management Plan SHN 016098.003
	April 2022 | SGMP_Fig2_SitePlan	Figure 2



PARCEL BOUNDERIES SHOWN ON THIS MAP ARE APPROXIMATE AND BASED ON A COMBINATION OF RECENT SURVEY INFORMATION AND HISTORICAL DOCUMENTATION.

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SHN	Royal Gold Soil & Groundwater Management Plan Glendale Dr., Humboldt County, California	Assessor Parcel Numbers SHN 016098.003
	August 2021 | SGMP_Fig3_APNs	Figure 3

- Building F (or Addition to Existing Building): This proposed improvement would involve either: 1) construction of an approximately 2,500-square-foot (50-foot by 50-foot) two-story building adjacent to the eastern edge of the existing pole-shed-style metal building on APN 516-101-079; or 2) construction of an approximately 2,500-square-foot addition to the eastern portion of the existing pole-shed-style metal building on APN 516-101-079. Both potential options would be constructed of metal.
- Fueling Station: Construction of a new aboveground fueling station at the facility that would be used for fueling the heavy equipment used onsite is proposed. The new fueling station will include a double-wall steel tank for diesel fuel, no larger than 5,000 gallons, that meets UL-2085 standards and relevant building and fire codes for California. The specific location of the fueling station has not been finalized but will be located away from waterways and combustible materials.
- Stormwater Improvements and Wetland Impacts: Construction of additional stormwater management areas on the central eastern portion of the site that will convert wetlands into stormwater detention basins is proposed (SHN, 2020).
- Wetland Mitigation Area: Construction of a wetland mitigation area in the northwestern portion of the facility (APNs 516-101-040, -064, and -068) to mitigate for existing and proposed impacts to wetlands at the site is proposed.
- Security fencing and lighting: Installation of chain link security fencing (approximately 6 feet high) is proposed around remaining areas of the facility where equipment or materials are stored. Installation of security/perimeter lighting is proposed around the facility boundary adjacent to existing and proposed security fencing.

SHN recommends presuming that the entirety of the property's soil and groundwater may be impacted with PSCs. This SGMP is based on contaminants found in soil and groundwater samples collected from the former McNamara & Peepe (M&P) lumber mill, which was historically located on the Royal Gold facility. Publicly available data and submittals uploaded on the California Department of Toxic Substances Control (DTSC) Envirostor website were reviewed and used to prepare this SGMP. Contaminants will degrade over time, resulting in the variability in concentrations previously reported. The M&P regulatory case is active and groundwater monitoring activities are ongoing. SHN recommends that the Envirostor website be reviewed when subsurface work at the facility is proposed as there is the potential for reporting of data more current than available at the time of the preparation of this document.

This SGMP will be provided to and used by Royal Gold staff, and training will be provided regarding adherence to its recommendations. This SGMP shall be provided to contractors prior to conducting subsurface work. Any soil sampling and reporting will be performed by qualified personnel under the direction of a licensed engineer or geologist.

2.0 Site Description

2.1 Site Operations

The Royal Gold facility operates on 16 separate parcels located on the north side of Glendale Drive, Glendale, California, totaling approximately 46 acres. The Royal Gold soil operation facility boundary encompasses approximately 34 acres of these parcels. Royal Gold, LLC has been in operation since

2005, and has been operating at the project site since March 2009. The project site is located in the unincorporated community of Glendale on an existing industrial site that has been used for industrial purposes since the 1940s.

Since beginning operations at the site, Royal Gold has expended substantial capital investments to restoring the site and removing remnant debris and equipment from past industrial uses. Portions of seven of the parcels, further defined as APNs 516-101-040, -063, -064, -068, -083, -084, and 516-111-062, are located outside the facility boundary (Figure 3). In total, approximately 12 acres of the seven parcels are not located within the facility boundary.

The Royal Gold facility's location is SW ¼, Section 13, T6N, R1E, H.B. & M. Arcata North 7.5-min United States Geological Survey (USGS) quadrangle at 40.900839° N latitude and -124.022139° W longitude. Elevations at the project site vary from approximately 90 to 125 feet above mean sea level. The Royal Gold facility boundary is shown on Figure 2.

2.2 Groundwater Depth and Flow Direction

Based on SHN's review of publicly available information contained on the DTSC Envirostor website, the former M&P mill (DTSC Case No. 12240115), groundwater was encountered between approximately 8 to 16 feet below grade during the groundwater monitoring events. Groundwater flow is to the south, toward Glendale Drive and the Mad River.

Groundwater elevations at the site have risen approximately 10 feet since 2002. PCP and TCP were not detected in significant concentrations in groundwater samples until December 2003. Documents contained on the Envirostor website from various consultants and the DTSC have suggested that the elevated levels of PCP and TCP mobilizing into groundwater may be due to Blue Lake Forest Products, Inc. ceasing operations and extraction of groundwater from the onsite water supply well.

The most recent groundwater monitoring event occurred on March 5, 2021 (SHN, 2021). During this event, depth to water (DTW) was measured in eight monitoring wells and was between approximately 5 and 11.5 feet below ground surface (BGS). Based on groundwater elevation data, groundwater flow direction was found to be to the south-southeast toward Glendale Drive and the Mad River, which is consistent with historical observations.

3.0 McNamara & Peepe Lumber Mill Facility/ Regulatory History

The M&P site, which operated on the Royal Gold facility, was used as a lumber mill from the late 1940s until ceasing operations in 2002. Beginning in April 1967, approximately 8 percent of the rough green lumber was treated by immersion in a chemical fungicide containing PCP and TCP for the purpose of preventing mold and fungal growth. From April 1967 to May 1984, this chemical fungicide was applied to processed lumber in dip tanks in an area known as the green chain. The green chain area consisted of a conveyor system that was used to move lumber and included the original dip tanks where lumber was submersed in a PCP solution.

Spillage and drippings of the wood solutions are believed to have caused PCP and TCP contamination of the soil and groundwater in this area. The contamination is believed to have occurred during the ownership and operation under Molalla-Arcata (1950 to 1969) and M&P (1969 to 1984). In June 1981, a PCP spill occurred at the green chain building. Between August and December 1981, the dip tank operation at the green chain was dismantled and a new dip tank was installed in an existing building on the southern end of the site, just south of Glendale Drive. Untreated lumber was dipped in a PCP-based solution at this location until M&P ceased operations after filing for bankruptcy in 1985.

From 1987 through 1989, remedial investigations were conducted by the M&P bankruptcy trustee under the oversight of Department of Health Services (DHS). The remedial investigation focused on five areas of potential contamination on the site. However, it was determined that only the green chain area had significant levels of contamination. In March 1989, DHS issued a Remedial Action Order to M&P requiring M&P to determine the nature and extent of the release at the site, characterize the site, prepare a remedial action plan (RAP), and conduct remediation of the site. In December 1994, DTSC approved a RAP for the site. The RAP included consolidation of contaminated soils and placement of a cap over the soils in the green chain area to prevent PCP and TCP detected in the soil from being discharged to the groundwater beneath the site and to surface waters draining from the site. This was completed by March 1998.

A “Covenant to Restrict Use of Property” was executed between M&P; Blue Lake Forest Products, Inc.; and DTSC in February 1998, and a land use restriction was recorded with the Humboldt County Assessor in March 1998 (DTSC, 1998). The Land Use Covenant (LUC) designates two restricted areas at the former mill site: the portion of the property where the concrete protective cover was installed over the former green chain (the Cap, Figure 2) and the portion of the former mill where the concrete slab floor of the unit dip tank building is located (Concrete Slab Restricted Area). The Concrete Slab Restricted area is located south of Glendale Drive, and that area is not part of the Royal Gold facility. Contaminated soils containing PCP, TCP, dioxins, and furans lie beneath the Cap and the Concrete Slab Restricted Area. The LUC restricts the use of the Cap and the Concrete Slab Restricted Area to commercial industrial activities and prohibits the building of residences, hospitals, daycares, or schools for persons under 21 years. The Covenant requires that the integrity of the Cap and Concrete Slab Restricted Area be maintained and contaminated soil beneath the Cap and Concrete Slab Restricted Area not be disturbed without a soil management plan previously approved by DTSC. A copy of the LUC is included in Appendix 1.

In April 2002, Blue Lake Forest Products, Inc. ceased operations at the site and filed for bankruptcy. With the completion of the bankruptcy in February 2003, Blue Lake Forest Products, Inc. was ordered by the bankruptcy court to continue the operation and maintenance at the site as required by the DTSC-approved Operations and Maintenance (O&M) agreement dated August 15, 1997. Blue Lake Forest Products, Inc. did continue to monitor the groundwater and inspect the Cap. The last time Blue Lake Forest Products, Inc. conducted groundwater monitoring and the annual cap inspection was in 2005.

From November 2014 to November 2019, six groundwater monitoring sampling events have occurred. Groundwater samples were analyzed for PCP and TCP for six groundwater monitoring events. Monitoring wells MW-7, MW-8, MW-9, and MW-10 had no detections of PCP or TCP for all six monitoring events. MW-11 had a single detection of PCP in May 2017 at 1.9 micrograms per liter (µg/L). MW-12 had its highest detections of PCP during the May 2016 sampling event at 120 µg/L. MW-1 had its highest detection of PCP during the August 2019 sampling event at 1,200 µg/L.

Soil samples were collected by URS Corporation in November 2011 and April 2012 within the foundation of the former sawmill building, which lies immediately east of the Cap. Five borings were advanced to depths of 15 feet BGS. PCP was detected at 1.8 milligrams per kilogram (mg/kg) at 3 feet BGS and at 2.2 mg/kg at 6 feet BGS in boring EB-12 during the November 2011 sampling event. PCP was detected at a maximum concentration of 40 mg/kg at EB-18 at 6 feet BGS during the April 2012 sampling event.

DTSC issued a Decertification on December 28, 2018, rescinding the March 9, 1998, Remedial Action Certification. DTSC stated that the remedy selected in the 1994 RAP was no longer protective for the following reasons: rising groundwater level has mobilized PCP/TCP in soil beneath the green chain area; surface water can percolate through PCP/TCP-impacted soil present below the former sawmill as the area is partially unpaved and/or covered with a building foundation in poor condition; and PCP/TCP can migrate offsite in groundwater or surface water runoff across the former sawmill area. The current DTSC investigation is ongoing. Additional data collected by DTSC regarding soil, groundwater, or surface water will be reviewed and considered in implementation of this SGMP.

4.0 Pre-Construction Characterization

There is limited soil and groundwater data available for the northern, eastern, and some areas of the central portion of the site. Data is available for areas in the southern and southeastern portions of the site, in the general vicinity of the former green chain and LUC area, and documents concentrations of dioxins/furans and chlorinated phenols. Publicly available documents for soil and groundwater quality data in the area of the former sawmill building infrastructure is limited. Therefore, prior to ground disturbance for construction, SHN is recommending pre-characterization sampling and laboratory analysis for soil and groundwater (if encountered). For the purposes of this plan, ground disturbance means any work or activity associated with the site improvements proposed by Royal Gold that results in a disturbance of the earth, including excavating, digging, trenching, drilling, tunnelling, augering, backfilling, topsoil stripping, land levelling, clearing, and grading. A site safety plan is included in Appendix 2.

Soil and groundwater (if encountered) samples will be collected from test pits installed using a backhoe in the areas where excavation and construction are planned to occur. Excavation and other ground-disturbing activities will be conducted at the site during construction of the proposed improvements listed in Section 1.0. The number of test pits installed in each area will be in accordance with Table 1 and as detailed in Section 4.1. Test pits will be installed to the proposed depth of disturbance for each area/activity in accordance with Table 2 in Section 4.2. Any soil sampling and reporting will be performed by qualified personnel under the direction of a licensed engineer or geologist.

4.1 Sample Location Frequency

For features measured by the square foot (buildings, fueling station footprint, and stormwater drainage infrastructure), one test pit for every 5,000 square feet will be installed within the footprint of the structure. If the structure has a total area less than 5,000 square feet, then one test pit will be installed within the footprint.

For trenches measured by linear foot (utility lines and stormwater swales), one soil sample for every 100 linear feet along that feature will be collected and submitted for laboratory analysis. If the trench is less

than 100 feet, then one soil sample will be collected. If improvements such as utility lines will be installed by horizontal drilling, then no sampling is recommended, and soil from installation will be stockpiled for and sampled for disposal or re-use determination.

Grading will primarily occur in the planned paving areas and wetland mitigation area. One soil sample will be collected within the grading footprints for every 15,000 square feet of disturbed soil. Minimal soil disturbance is necessary for the installation of posts (security lighting and security fencing), so no sampling is recommended, and soil from post installation will be stockpiled for and sampled for disposal or re-use determination.

Table 1. Sampling Location Frequency by Construction Feature
Royal Gold, Glendale, California

Construction Feature	Measuring Unit	Sampling Location Frequency per area of Disturbance
Buildings	ft^2 [a]	1 location each 5,000 ft^2
Fueling Station	ft^2	1 location each 5,000 ft^2
Stormwater Infrastructure	ft^2	1 location each 5,000 ft^2
Wetland Mitigation Area	ft^2	1 location each 15,000 ft^2
Grading/Paving Areas	ft^2	1 location each 15,000 ft^2
Utility Infrastructure	feet (linear)	1 location each 100 feet (linear trench)

[a] ft^2: square feet

4.2 Pre-Characterization Sample Depths

Samples should be collected to the depths of proposed ground disturbing activities in construction areas. Sampling depth will be variable, depending on the depth of the proposed ground disturbance. According to Royal Gold, no excavation deeper than 15 feet is anticipated to occur for the proposed improvements. Proposed sampling depths are shown in Table 2.

Table 2. Pre-Construction Characterization Sample Depths
Royal Gold, Glendale, California

Proposed Depth of Disturbance (feet below grade)	Analytical Method
1 to 5 feet	1 per location at mid-point of total disturbance depth
5.1 to 10 feet	Composite 2 per location at 1/3 and 2/3 of total disturbance depth
10 to 15 feet	Composite 3 per location at 1/3, 2/3 and 3/3 of total disturbance depth

Soil from the test pits will be field-screened using a photoionization detector and soil will be described in general accordance with the Unified Soil Classification System under the direction of a California-licensed geologist. Soil samples will be placed in an iced cooler, shipped to the analytical laboratory under chain-of-custody documentation, and analyzed for constituents described in "Section 4.3: Laboratory Analysis."

If groundwater is encountered in any test pit, a sample will be collected for laboratory analysis. A temporary polyvinyl chloride (PVC) well casing and screen will be inserted into the groundwater in the

test pit. A sample will be collected by using a peristaltic pump or new tubing with a bottom mounted check valve. Groundwater samples will be placed in an iced cooler, shipped to the analytical laboratory under chain-of-custody documentation, and analyzed for constituents described in "Section 4.3: Laboratory Analysis."

Following the sampling, the test pit spoils will be placed in the test pit and tamped flat using the backhoe bucket.

4.3 Laboratory Analysis

SHN is recommending soil and groundwater (if encountered) be analyzed for the PSCs outlined in Table 3.

Table 3. Pre-Construction Characterization Laboratory Analytical Testing
Royal Gold, Glendale, California

Constituent of Concern	Analytical Method
Total Petroleum Hydrocarbons (TPH) as Motor Oil and Diesel	EPA Method 8015M
TPH as Gasoline and Volatile Organic Compounds (VOCs)	EPA Method 8260B Modified or 8260B
PCP[1] and TCP[2]	Canadian Pulp Report/NCASI 86.07
Dioxins and Furans	EPA Method 1613

[1] PCP: pentachlorophenol
[2] TCP: tetrachlorophenol

A State of California-certified analytical laboratory will perform the analyses.

4.4 Reporting

A summary report will be prepared documenting the results of the pre-construction characterization soil and groundwater (if encountered) samples. The results will be shown on a site map to identify soils for unrestricted re-use onsite, those that contain concentrations suitable for limited re-use onsite, and those that may need to be disposed of offsite at an approved facility. These designations will be based on the results from the pre-characterization and compared to applicable regulatory screening levels. Based on the PSCs, the applicable regulatory screening levels are contained in DTSC Human Health Risk Assessment (HHRA) Note Number 2 and Note Number 3. It is recommended that any sampling results that exceed residential screening levels be submitted to DTSC for review.

5.0 Best Management Practices

Prior to beginning construction, supervisors and workers shall review this document and the pre-characterization sampling report and familiarize themselves with the following:

- Pre-construction characterization data and maps indicating the location of any impacted materials
- Conducting earthwork in a manner that minimizes disturbance

- Segregating any stockpiles based on the information from the pre-construction characterization report

5.1 Notifications to be Performed Before Subsurface Work at the Facility

Prior to conducting subsurface work on the property, Underground Service Alert will be notified, and Royal Gold will provide its staff and/or contractors with this document and the summary report from the pre-construction soil characterization. Royal Gold staff and contractor's site supervisor will read those documents and become familiar with the potential hazards associated with working in any identified contaminated areas of the site. The site supervisor for Royal Gold and contractor's designated supervisor will conduct a site meeting with personnel who may potentially encounter contaminated soil and/or groundwater.

During the site meeting, Royal Gold staff or the site supervisor for the designated contractor will instruct site personnel on the appropriate actions to be taken in each area for disturbance. A copy of the documents shall be available onsite for Royal Gold personnel and with the construction contractor during constructions activities. In addition to the guidance provided in this SGMP, the attached Site Safety Plan outlines the necessary protocols for keeping workers safe if contact or exposure to hazardous substances occurs during construction operations. The contractor shall provide this SGMP, the Site Safety Plan, and the pre-construction characterization report, to their subcontractors employed on this project. It is also recommended that a qualified professional be onsite with a photoionization detector to monitor vapors during all excavation and grading activities.

5.2 General Construction Practices to Minimize the Disruption and Potential for Offsite Disposal/Transport of PSC-impacted Material During Subsurface Work

Standard construction best management practices (BMPs) will be implemented during project activities to control stormwater runoff and to manage fugitive dust and dispersion of material. Standard BMPs are not limited to, but will include:

- Using 6-mil plastic as a bottom barrier and cover for stockpiles
- Applying straw wattles held in place with sandbags around the base of stockpiles as erosion control
- Applying potable water to the project area to prevent fugitive dust, as needed
- Applying appropriate controls to control track on and track off of sediment to roadways.

6.0 Waste Management Plan

This SGMP provides recommended guidance to minimize the threat of exposure to workers, the environment, and sensitive receptors and outlines general procedures for onsite reuse and offsite disposal of PSC-impacted soil and groundwater that may be disturbed during proposed construction activities at the property.

Any soil removed as part of a soil disturbance will be stockpiled in a location that is away from operations and industrial stormwater pathways, where it will be covered and surrounded with berms or wattles. Handling of materials will be done in such a way as to prevent release of contamination to onsite or offsite areas.

Soil that is determined to be suitable for unrestricted use can be stockpiled and used for general filling and grading as needed. Soil that is designated for limited reuse onsite will be placed under buildings or paved areas as fill. Soil that is designated for offsite disposal will be characterized and handled as described in section 6.2.

6.1 Stockpiled Soil for Reuse Onsite

Stockpiled soils for onsite reuse will be sampled and submitted for laboratory analysis for characterization as outlined in Section 4.3 Laboratory Analysis. One 4-to-1 composite soil sample will be collected for every 250 cubic yards of stockpiled material. Any soil sampling and reporting will be performed by qualified personnel under the direction of a licensed engineer or geologist. Pending laboratory results and approval by DTSC, materials may be deemed suitable for reuse onsite. Materials proposed for reuse would include stockpiled soil that is characterized and found to be non-hazardous and considered clean soils through analytical testing (below residential screening levels). Or soils with concentrations of contaminants below commercial/industrial screening levels will be limited use, and placed under buildings or pavement. Based on the PSCs, the applicable regulatory screening levels are contained in DTSC Human Health Risk Assessment (HHRA) Note Number 2 and Note Number 3. Prior to reuse, a letter will be prepared and submitted to DTSC with the total volume of reuse proposed for placement and supporting laboratory analytical data.

6.2 Stockpiled Soil for Offsite Disposal

Impacted soil that is characterized and found to be unsuitable for reuse will be profiled and transported offsite to an appropriate waste facility licensed to take the material. Laboratory results from material characterization will undergo data quality assurance/quality control (QA/QC) procedures then be provided to the receiving facility for profiling and waste classification code determination. Information for testing and profiling of the material and the disposal facility selected to receive the material will be provided to DTSC prior to transport offsite for disposal.

Waste transporters and disposal facilities will be appropriately licensed, permitted, and properly insured. The management of the transportation and disposal of waste to the permitted waste facility shall be the responsibility of the contractor. Hazardous waste transport for offsite disposal shall be performed in accordance with the Department of Transportation Hazardous Material Transportation Regulations 49 Code of Federal Regulations (CFR) Part 171 and 180, 40 CFR Part 262, Subpart B, and Title 22 California Code of Regulations Section 66262, which involve packaging, placarding, labeling and manifesting requirements. All waste shall be removed from the site within 90 days or as required. Documentation for material transport (manifests) and disposal (weight tags) will be provided to DTSC in a summary letter at the completion of the project.

6.3 Impacted Groundwater

Impacted groundwater that is encountered during construction activities will be pumped into appropriate containers and stored onsite pending analytical results. The groundwater will be sampled and submitted for laboratory analysis for characterization using the same constituents outlined for soil.

The analytical results will be used to determine the proper handling and disposal method for the groundwater. If the groundwater requires treatment and offsite disposal, a contractor licensed to handle such material will transport the material to a facility licensed to accept such material for treatment and disposal. If a small volume of water requires offsite disposal, approved 55-gallon steel drums may be appropriate. If a large volume of water requires offsite disposal, a Baker tank or equivalent may be necessary.

7.0 References Cited

California Department of Toxic Substances Control. (1998). Site certification issued. NR:DTSC.

---. (April 2017). "Human Health Risk Assessment (HHRA) Note Number 2: Soil Remedial Goals for Dioxins and Dioxin-like Compounds for Consideration at California Hazardous Waste Sites." NR:DTSC, Human and Ecological Risk Office (HERO)

---. (December 28, 2018). Decertification rescinding the March 9, 1998, Remedial Action Certification. NR:DTSC.

---. (June 2020). "Human Health Risk Assessment (HHRA) Note Number 3: DTSC-modified Screening Levels (DTSC-SLs)." NR:DTSC.

County of Humboldt. (February 1998). Land Use Covenant (LUC) recorded. Eureka, CA:Humboldt County.

McNamara & Peepe, Blue Lake Forest Products, Inc., and California Department of Toxic Substances Control. (February 1998). "Covenant to Restrict Use of Property," NR:M&P, BLFP, and DTSC.

SHN. (November 2020). "Wetland Mitigation and Monitoring Plan Addendum 1, Royal Gold Premium Potting Soils, LLC." Eureka, CA:SHN.

---. (July 21, 2021). Groundwater Monitoring Report, Former McNamara and Peepe Lumber Mill, 1619 Glendale Drive, Arcata, California." Eureka, CA:SHN.

Land Use Covenant

1

1998-2896-38
Recorded — Official Records
Humboldt County, California
Carolyn Crnich, Recorder
Recorded by MCNAMARA & PEEPE CORP
Exempt from payment of fees
Clerk: AG Total: 0.00
Feb 4, 1998 at 11:32

Recording Requested By:

McNamara and Peepe Corporation
Blue Lake Forest Products, Inc.

When Recorded, Mail To:

California Environmental Protection Agency
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, California 94710
Attention: Barbara J. Cook, P.E., Chief
Northern California - Coastal Cleanup
Operations Branch

COVENANT TO RESTRICT USE OF PROPERTY
MCNAMARA AND PEEPE LUMBER MILL

Recording Requested By:

McNamara and Peepe Corporation
Blue Lake Forest Products, Inc.

When Recorded, Mail To:

California Environmental Protection Agency
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, California 94710
Attention: Barbara J. Cook, P.E., Chief
Northern California - Coastal Cleanup Operations Branch

COVENANT TO RESTRICT USE OF PROPERTY
MCNAMARA AND PEEPE LUMBER MILL

This Covenant and Agreement ("Covenant") is made on the 12 day of January, 1998 by McNamara and Peepe Corporation ("McNamara"), the owner of record of certain property located at 1619 Glendale Drive, in the Community of Glendale, County of Humboldt, State of California, described in Exhibit "A" attached hereto and incorporated herein by this reference ("Property"), by Blue Lake Forest Products, Inc. ("Blue Lake"), which operates a lumber mill on the Property pursuant to a lease-purchase agreement with McNamara and which is the prospective owner of the Property, and by the California Environmental Protection Agency, Department of Toxic Substances Control ("Department"). McNamara and Blue Lake shall be referred to herein, collectively, as "Covenantors". This Covenant is made with reference to the following facts:

A. The Property contains hazardous substances.

B. Description of Facts.

B.1. Contamination of the Property. A lumber mill has been operated by several owners/operators of the Property. Anti-stain solutions containing pentachlorophenol (PCP) and tetrachlorophenol (TCP) were applied to lumber at the Property's green chain equipment, and anti-stain solutions containing PCP, TCP and copper-8-quinolinolate were applied to lumber at the Property's unit dip tank building. As a result of this activity, PCP and TCP were released to soil at and nearby the Property's green chain equipment, and PCP, TCP and copper-8-quinolinolate were released to soil beneath the Property's unit dip tank building. Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) have also been found in the soil at the Property's green chain equipment. The PCDDs and PCDFs are likely associated with the anti-stain solutions since they are undesired byproducts formed during the manufacture of PCP and TCP.

B.2. Exposure Pathways. The risk of public exposure to the contaminants will be minimized by: 1) covering contaminated soil at and adjacent to the Property's green chain equipment with a concrete cap; and 2) leaving in place the concrete slab floor of the

Property's unit dip tank building. If contaminated soil at the Property were uncovered or left uncovered, human exposure could take place by dermal contact and incidental ingestion, and migration of contaminants could occur through surface water runoff and infiltration of precipitation.

C. The Property is presently owned by McNamara. The Property has been developed as a lumber mill, an industrial use, and is currently operated as such. The lumber mill is presently operated by Blue Lake, which intends to take title to the Property pursuant to its lease-purchase agreement with McNamara.

D. The Department has determined that use restrictions must be imposed on the Property to ensure full protection of public health and safety and the environment.

E. Pursuant to California Civil Code section 1471(c), the Department has determined that this Covenant is reasonably necessary to protect present or future human health or safety or the environment as a result of the presence on the Property of hazardous materials within the meaning of California Health and Safety Code ("H&SC") section 25260.

F. Covenantors agreed to enter into this Covenant, and to abide by its terms, in the Settlement Agreement and Consent Decree (the "Consent Decree") approved by the United States District Court for the Northern District of California (the "Court"), and entered as a consent decree of the Court on July 25, 1997, in the case entitled *State of California Department of Toxic Substances Control v. Blue Lake Forest Products, Inc., et al.*, Case No. C 97-2048 CW. Covenantors, by entering into the Consent Decree with the Department, agreed to execute this Covenant, and to abide by its terms, in partial consideration for the Department's qualified release of Covenantors' potential liability for the Property, effected by the Consent Decree.

ARTICLE I

PARAMETERS OF COVENANT

1.1 Restrictions to Run With the Land. This Covenant sets forth protective provisions, covenants, restrictions, and conditions (collectively referred to as "Restrictions"), upon and subject to which the Restricted Areas of the Property, as defined in section 2.4 of this Covenant, and every portion thereof, shall be improved, held, used, occupied, leased, sold, hypothecated, encumbered, and/or conveyed. Each and all of the Restrictions: (a) shall run with the land, pursuant to H&SC section 25355.5;

(b) shall inure to the benefit of, and pass with each and every portion of the Restricted Areas of the Property; (c) shall apply to and bind the respective successors in interest thereof; (d) are for the benefit of, and shall be enforceable by, the Department; (e) are imposed upon each and every portion of the Restricted Areas of the Property, unless expressly stated as applicable only to a specific portion or portions thereof; (f) are imposed pursuant to H&SC sections 25355.5 and 25356.1.

1.2 Concurrence of Owner(s)/Occupant(s). Each and every Owner and Occupant, as defined in sections 2.6 and 2.7 of this Covenant, shall be deemed to be in accord with this Covenant and shall further be deemed to unconditionally agree, for and among themselves, their heirs, successors, and assignees (and for any agents thereof), to the Restrictions as herein established such that their interest(s) and/or possessory rights in the Restricted Areas of the Property are taken subject to such restrictions.

ARTICLE II

DEFINITIONS

2.1 Department. "Department" shall mean the California Environmental Protection Agency, Department of Toxic Substances Control, and shall include its successor agencies, if any.

2.2 Cap. "Cap" shall mean the concrete protective cover to be constructed on a portion of the Property, in order to isolate contaminated soils on the Property and thereby prevent human exposure to and migration of those soils.

2.3 Concrete Slab. "Concrete Slab" shall mean the concrete slab floor of the unit dip tank building located on the Property. Contaminated soils lie beneath the Concrete Slab, and the Concrete Slab prevents human exposure to and migration of those soils.

2.4 Restricted Area(s). "Restricted Area(s)" shall mean the portion of the Property where the Cap will be constructed (the "Cap Restricted Area") and the portion of the Property where the Concrete Slab is located (the "Concrete Slab Restricted Area"). The legal description of the Cap Restricted Area is attached hereto as Exhibit B and incorporated herein by this reference. The legal description of the Concrete Slab Restricted Area is attached hereto as Exhibit C and incorporated herein by this reference.

2.5 Improvements. "Improvements" shall mean all buildings, structures, fixtures, roads, driveways, regrading, and paved parking areas, constructed or placed upon any portion of the Restricted Areas.

2.6 Owner(s). "Owner(s)" shall mean McNamara or its successors in interest, including, upon consummation of its agreement to purchase the Property, Blue Lake, and including any other heirs or assigns of McNamara or Blue Lake who hold title to all or any portion of the Restricted Areas.

2.7 Occupant(s). "Occupant(s)" shall mean Blue Lake, and any other person who, in the future, is entitled by ownership, leasehold, or other legal relationship to the exclusive right to occupy any portion of the Restricted Areas.

ARTICLE III

RESTRICTIONS

3.1 Incorporation Into Deeds and Leases. Owner and Occupant agree that the Restrictions set forth herein shall be incorporated by reference in each and every deed or lease (including any sub-lease) for any portion of the Restricted Areas.

3.2 Restrictions on Use. Owner and Occupant agree to restrict the use of the Restricted Areas in accordance with the restrictions set forth herein in order to protect present and future public health and safety and to prevent potential harm to persons that might result from exposure to the hazardous substances deposited on the Restricted Areas. Owner and Occupant

agree not to use the Restricted Areas for any of the following purposes:

(a) A residence, including any mobile home or factory built housing, constructed or installed for use as permanently-occupied residential habitation.

(b) A long-term care hospital for humans.

(c) A day care facility for children or senior citizens.

(d) A public or private school for persons under 21 years of age.

3.3 Maintenance of the Cap. Owner and Occupant agree that:

(a) The integrity of the Cap shall be maintained at all times. Moreover, no portion of the Cap Restricted Area shall be used or developed in such a way as to jeopardize the integrity of the Cap. Among other things, the use of equipment or vehicles on the Cap that exceed the Cap's design load, as set forth in Exhibit D to this Covenant, incorporated in this Covenant by this reference, shall constitute the use or development of the Cap Restricted Area in such a way as to jeopardize the integrity of the Cap.

(b) The Cap shall not be removed or modified without the Department's prior written approval. (As used in this section, "modification" of the Cap shall mean any construction or activity on the Cap that would disturb or jeopardize the integrity of the Cap). Any Owner, or with the Owner's consent, any Occupant who or which owns or occupies any portion of the Cap Restricted Area may seek the Department's permission to remove or modify any part of the Cap lying on the portion of the Cap Restricted Area that he, she or it owns or occupies. Said request shall be made in writing and submitted at least sixty (60) days prior to the proposed removal or modification. The written request shall be sent by certified mail to the Department at the address set forth in section 6.2 of this Covenant. The written request shall include a detailed description of the proposed removal or modification, and a map showing the exact location of the proposed removal or modification, and shall set forth the reasons for the proposed removal or modification.

(c) The contaminated soil beneath the Cap shall not be disturbed unless a Soil Management Plan and a Health and Safety Plan governing the removal of that soil have been submitted to the Department and received the review and approval of the Department.

(d) Any Owner or Occupant who or which owns or occupies any portion of the Cap Restricted Area shall notify the Department of the following:

1) the type, cause, location and date of any disturbance to any part of the Cap lying on the portion of the Cap Restricted Area that he, she or it owns or occupies that could affect the ability of the Cap to contain subsurface hazardous substances; and

2) The type and date of the repair of such disturbance.

Notification to the Department shall be made as provided in section 6.2 of this Covenant within ten (10) working days of both the discovery of any such disturbance(s) and the completion of any repairs.

3.4 Maintenance of the Concrete Slab. Owner and Occupant agree that:

(a) The integrity of the Concrete Slab shall be maintained at all times. Moreover, no portion of the Concrete Slab Restricted Area shall be used or developed in such a way as to jeopardize the integrity of the Concrete Slab.

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(b) The Concrete Slab shall not be removed or modified without the Department's prior written approval. (As used in this section, "modification" of the Concrete Slab shall mean any construction or activity on the Concrete Slab that would disturb or jeopardize the integrity of the Concrete Slab). Any Owner, or with the Owner's consent, any Occupant who or which owns or occupies any portion of the Concrete Slab Restricted Area may seek the Department's permission to remove or modify any part of the Concrete Slab lying on the portion of the Concrete Slab Restricted Area that he, she or it owns or occupies. Said request shall be in writing, submitted at least sixty (60) days prior to start of the proposed removal or modification. The written request shall be sent by certified mail to the Department at the address set forth in section 6.2 of this Covenant. The written request shall include a detailed description of the proposed removal or modification, and a map showing the exact location of the proposed removal or modification, and shall set forth the reasons for the proposed removal or modification.

(c) The contaminated soil beneath the Concrete Slab shall not be disturbed unless a Soil Management Plan and a Health and Safety Plan governing the removal of that soil have been submitted to the Department and received the review and approval of the Department.

(d) Any Owner or Occupant who or which owns or occupies any portion of the Concrete Slab Restricted Area shall notify the Department of the following:

1) The type, cause, location and date of any disturbance to any part of the Concrete Slab lying on the portion of the Concrete Slab Restricted Area that he, she or it owns or occupies that could affect the ability of the Concrete Slab to contain subsurface hazardous substances; and

2) The type and date of the repair of such disturbance.

Notification to the Department shall be made as provided in section 6.2 of this Covenant within ten (10) working days of both the discovery of any such disturbance(s) and the completion of any repairs.

3.5 Access. The Department or its designated representatives shall have access to the Restricted Areas for the purposes of inspection, surveillance, monitoring or other actions necessary to protect public health, safety or the environment.

3.6 Conveyance of Property. All Owners and Occupants shall provide a thirty (30) day advance notice to the Department of any sale, lease, sub-lease or other conveyance (not including any

mortgage or deed of trust), to a third person, of any Restricted Area, or any portion thereof or interest therein. The Department shall not have the authority to approve, disapprove, or otherwise affect any sale, lease, or other conveyance of any Restricted Area, or any portion thereof, or any interest therein, except as otherwise provided in this Covenant or by operation of law.

3.7 Notice in Agreements. All Owners and Occupants shall execute a written instrument which shall accompany all purchase, lease, sublease, and rental agreements, and other conveyance documents, relating to any portion of a Restricted Area. The instrument shall contain the following statement:

> "The land described herein contains hazardous substances. Such condition renders the land, the property, and the owner, lessee, or other occupant of the land or property subject to the requirements, restrictions, provisions, and liabilities contained in Chapter 6.5 and Chapter 6.8 of Division 20 of the California Health and Safety Code. This statement is not a declaration that a hazard exists."

ARTICLE IV

VARIANCE AND REMOVAL OF RESTRICTIONS

4.1 Variance. Any Owner or, with the Owner's consent, any Occupant of any Restricted Area, or any portion thereof, may

apply to the Department for a written variance from any of the Restrictions or requirements of this Covenant that apply to said Restricted Area, or any portion thereof. Such application shall be made in accordance with H&SC section 25233.

4.2 Removal of Restrictions. Any Owner or, with the Owner's consent, any Occupant of any Restricted Area, or any portion thereof, may apply to the Department to remove any of the Restrictions or requirements of this Covenant that apply to said Restricted Area, or any portion thereof. Such application shall be made in accordance with H&SC section 25234.

4.3 Term. Unless modified or removed in accordance with sections 4.1 or 4.2 above, the Restrictions and requirements of this Covenant shall continue in effect in perpetuity.

ARTICLE V

ENFORCEMENT

5.1 Enforcement. Failure of any Owner or Occupant to comply with any of the Restrictions or requirements of this Covenant that apply to said Owner or Occupant shall be grounds for the Department to require the Owner or Occupant to modify or remove any Improvement constructed, or to remedy the effects of any other action taken, in violation of this Covenant. Any violation

of this Covenant shall be grounds for the Department to take enforcement action, including the filing of an administrative, civil or criminal action, as provided by law, against the Owner or Occupant.

ARTICLE VI

MISCELLANEOUS

6.1 No Dedication Intended. Nothing set forth herein shall be construed to be a gift or dedication, or offer of a gift or dedication, of the Property or any portion thereof to the general public or for any purposes whatsoever.

6.2 Notices. Whenever any person gives or serves any notice, demand, or other communication with respect to this Covenant, such notice, demand, or other communication shall be in writing and shall be sent simultaneously to authorized representatives of the Department, the Owner and the Occupant, by certified mail, with return receipt requested.

Department Address:

California Environmental Protection Agency
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, California 94710-2737
Attention: Chief, Northern California--Coastal Cleanup
Operations Branch

Owner Address:

McNamara and Peepe Corporation
c/o William B. Grover
1926 East Foothill
Santa Rosa, California 95404

Occupant Address:

Blue Lake Forest Products, Inc.
c/o Richard A. Smith, Esq.
The Harland Law Firm
622 H Street
Eureka, CA 95501

In the event that the identity of any Owner or Occupant of the Restricted Areas should change, the new Owner or Occupant shall notify the Department, and all other Owners and Occupants of the Restricted Areas, within ten (10) days of becoming an Owner or Occupant of the Restricted Areas. In the event that the address of any Owner or Occupant of the Restricted Areas should change, the Owner or Occupant whose address changed shall notify the Department, and all other Owners and Operators of the Restricted Areas, within ten (10) days of its change of address.

6.3 Partial Invalidity. If any portion of this Covenant is determined by a court of competent jurisdiction to be invalid or unenforceable for any reason, the remaining portions of this Covenant shall remain in full force and effect.

6.4 Recordation. This instrument shall be executed by the Owner, the Occupant and by the Chief, Northern California - Coastal Cleanup Operations Branch, Department of Toxic Substances Control, and shall be recorded by the Owner and the Occupant in the County of Humboldt within ten (10) days of the date of execution.

IN WITNESS THEREOF, the Covenantors and the Department execute this Covenant as of the date set forth above:

McNAMARA AND PEEPE CORPORATION

By: _____

Its _____

BLUE LAKE FOREST PRODUCTS, INC.

By: _____

BRUCE TAYLOR, President
Blue Lake Forest Products, Inc.

STATE OF CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY, DEPARTMENT OF TOXIC SUBSTANCES CONTROL:

By: _____

BARBARA J. COOK, P.E., Chief
Northern California - Coastal
Cleanup Operations Branch

C:\KEVIN\MCNAMARA.COV
(4/8/97)

STATE OF CALIFORNIA)
)
COUNTY OF)

On Dec 29 1997, 1997 before me, a Notary Public in and for State of California, personally appeared WILLIAM B. GRAUER, personally known to me or proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her authorized capacity, and that by his/her signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

ROBERT K. MAIZE JR
COMM. # 1011727
Notary Public — California
SONOMA COUNTY
My Comm. Expires JAN 21 1998

WITNESS my hand and official seal.

Notary's Signature

1998-2896-38

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6.4 Recordation. This instrument shall be executed by the Owner, the Occupant and by the Chief, Northern California - Coastal Cleanup Operations Branch, Department of Toxic Substances Control, and shall be recorded by the Owner and the Occupant in the County of Humboldt within ten (10) days of the date of execution.

IN WITNESS THEREOF, the Covenantors and the Department execute this Covenant as of the date set forth above:

McNAMARA AND PEEPE CORPORATION

By: _____

Its _____

BLUE LAKE FOREST PRODUCTS, INC.

By: _____

BRUCE TAYLOR, President
Blue Lake Forest Products, Inc.

STATE OF CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY, DEPARTMENT OF TOXIC SUBSTANCES CONTROL:

By: _____

BARBARA J. COOK, P.E., Chief
Northern California - Coastal
Cleanup Operations Branch

C:\KEVIN\MCNAMARA.COV
(4/8/97)

STATE OF CALIFORNIA)
)
COUNTY OF Humboldt)

On January 6, 1998 before me, a Notary Public in and for State of California, personally appeared Bruce M. Taylor, personally known to me or proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he/~~she~~ executed the same in his/~~her~~ authorized capacity, and that by his/~~her~~ signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

RAYETTA WARLICK
Commission # 1134245
Notary Public — California
Humboldt County
My Comm. Expires May 2, 2001

WITNESS my hand and official seal.

Rayetta Warlick
Notary's Signature

1998-2896-38

(31)

6.4 Recordation. This instrument shall be executed by the Owner, the Occupant and by the Chief, Northern California - Coastal Cleanup Operations Branch, Department of Toxic Substances Control, and shall be recorded by the Owner and the Occupant in the County of Humboldt within ten (10) days of the date of execution.

IN WITNESS THEREOF, the Covenantors and the Department execute this Covenant as of the date set forth above:

McNAMARA AND PEEPE CORPORATION

By: _____

Its _____

BLUE LAKE FOREST PRODUCTS, INC.

By: _____
BRUCE TAYLOR, President
Blue Lake Forest Products, Inc.

STATE OF CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY, DEPARTMENT OF TOXIC SUBSTANCES CONTROL:

By: Barbara J. Cook
BARBARA J. COOK, P.E., Chief
Northern California - Coastal
Cleanup Operations Branch

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(4/8/97)

(22)

CALIFORNIA

ALL-PURPOSE

ACKNOWLEDGEMENT

STATE OF CALIFORNIA)

COUNTY OF ALAMEDA)

On 1-12-98 (DATE) before me, Cheryl A. Branin (NAME, TITLE OF OFFICER - E.G., "JANE DOE, NOTARY PUBLIC")

personally appeared, Barbara J. Cook

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

PWR1 CHERYL A. BRANIN Comm. # 1032392 NOTARY PUBLIC - CALIFORNIA Alameda County My Comm. Expires Aug. 19, 1998 PWR1

Cheryl A. Branin (SEAL)
NOTARY PUBLIC SIGNATURE

OPTIONAL INFORMATION

TITLE OR TYPE OF DOCUMENT Covenant to Restrict Use of Property McNamara and Peepe Lumber Mill

DATE OF DOCUMENT 1-12-98 NUMBER OF PAGES 32

SIGNER(S) OTHER THAN NAMED ABOVE

1998-2896-38

SCHEDULE "A"

That real property situated in the County of Humboldt, State of California, described as follows:

TRACT A:

All those portions of Section 13, Township 6 North, Range 1 East, Humboldt Meridian described as follows:

PARCEL ONE:

BEGINNING at a point located North 81 degrees 30 minutes West, 120.78 feet from the Northwest corner of Southwest Quarter of Southeast Quarter of said Section 13;

thence South 82 degrees 30 minutes West 222 feet to the true point of beginning;

thence South 82 degrees 30 minutes West, 372 feet to the Northwest corner of the land conveyed to Jonnie E. Kane by Deed recorded July 12, 1890 in Book 35, Page 258 of Deeds, in the office of the County recorder of said county;

thence South 8 degrees East, 367.5 feet to the county road leading to Blue Lake;

thence along same, North 82 degrees East, 372 feet;

thence North, 367.5 feet to the point of beginning;

PARCEL TWO:

BEGINNING at a point on the North side of the county road running from Arcata to Blue Lake; and running

thence North 82 degrees East along the North side of said county road, 68 links to the Southwest corner of land formerly owned by John E. Kane as conveyed to him by A. Norton by Deed dated July 11, 1890 and recorded in Book 35 of Deeds, Page 258, in the Recorder's Office of Humboldt County, California;

thence North 8 degrees West along the West line of said Kane's land, a distance of 558 links to a point;

thence South 82 degrees West a distance of 290-1/2 links to a point;

thence in a Southerly direction to the place of beginning and being situated in the Southeast Quarter of the Southwest Quarter of Section 13, Township 6 North, Range 1 East, Humboldt Meridian, and being the same lot conveyed by A. Norton to Thomas Riley by Deed dated November 10, 1891, recorded in Book 41 of Deeds, Page 281, in the Recorder's Office of Humboldt County California.

PARCEL THREE:

BEGINNING at the Northwest corner of the Northeast Quarter of Southwest Quarter of Section 13, Township 6 North, Range 1 East, Humboldt Meridian; and running

thence South 89 degrees 50 minutes 15 seconds East along the subdivision line, 457.72 feet;

thence South 0 degrees 08 minutes 30 seconds East, 1397.46 feet to the Northwest corner of that parcel of land conveyed to Joseph L. Arnold and wife, by Deed dated January 18, 1936 and recorded in Book 256 of Deeds, Page 292;

thence South 20 degrees 38 minutes East 380.43 feet to the North line of the state highway;

EXHIBIT A

1998-2896-38

thence South 86 degrees 18 minutes West along the North line of the highway, 44.18 feet to the Northerly line of the right of way of Arcata and Mad River Railroad Company;

thence along the North line of said railroad right of way as follows:

North 51 degrees 40 minutes West 195.75 feet;
North 60 degrees 50 minutes West 75 feet;
North 67 degrees 59 minutes West 75 feet;
North 77 degrees 25 minutes West 75 feet;
North 85 degrees 03 minutes West 100 feet;
North 4 degrees 17 minutes East 13 feet;
and North 85 degrees 43 minutes West 87.19 feet to the subdivision line;

thence on same North 0 degrees 08 minutes 30 seconds West 1527.14 feet to the place of beginning.

TRACT B:

PARCEL ONE:

BEGINNING at the Northeast corner of the Northwest Quarter of the Southwest Quarter of Section 13, Township 6 North, Range 1 East, Humboldt Meridian; running

thence West, along the subdivision line, 778.7 feet to the Northeast corner of the parcel of land conveyed to Floyd Keith Walton and wife by Deed, recorded July 18, 1958, in Book 496 of Official Records, Page 423, as Recorder's File No. 10046, Humboldt County Records; running

thence South, along the East line of the Walton parcel and the Southerly extension thereof, 559.8 feet to the Northwest corner of the parcel of land conveyed to Leland A. Larsen and wife by Deed, recorded June 24, 1954, in Book 297 of Official Records, Page 385, as Recorder's File No. 8469, Humboldt County Records;

running thence South 89 degrees 40 minutes East, along the North line of said Larsen parcel, 770 feet to the East line of said Northwest Quarter of the Southwest Quarter, being marked by a 3/4-inch iron pipe monument;

and thence North, along the last mentioned line, 560 feet to the point of beginning.

EXCEPTING THEREFROM, that portion thereof, described as follows:

BEGINNING on the East line of the Northwest Quarter of the Southwest Quarter of Section 13, Township 6 North, Range 1 East, Humboldt Meridian, 764.21 feet North from the Southeast corner of said subdivision; and running

thence North 89 degrees 40 minutes West 100 feet to the true point of beginning;

thence North 0 degrees 27 minutes East 25.0 feet;
thence North 89 degrees 40 minutes West 342.3 feet;
thence South 0 degrees 27 minutes West 25.0 feet;
thence South 89 degrees 40 minutes East 342.3 feet to the true point of beginning;

continued...

EXHIBIT A
1998-2896-38

PARCEL TWO:

BEGINNING at the Southwest corner of Parcel One above described; and running
thence South 73 degrees 55 minutes West, 20.83 feet;
thence North, 77.28 feet;
thence South 60 degrees 00 minutes East, 23.09 feet to the West line of said Parcel One;
thence South, along the last mentioned line, 60 feet to the point of beginning.

PARCEL THREE:

A non-exclusive right of way for ingress, egress and public utility purposes over a strip of land of the uniform width of 20 feet, the East and North lines of which are described as follows:

BEGINNING at the Northeasterly corner of parcel Two and running
thence North 499.8 feet to the North line of the Northwest Quarter of the Southwest Quarter of Section 13, Township 6 North, Range 1 East, Humboldt Meridian;
thence West, along the last mentioned line, 560.3 feet to the Northwest corner of said subdivision.

PARCEL FOUR:

A non-exclusive right of way for ingress, egress and public utility purposes over a strip of land of the uniform width of 20 feet, the West and Southerly lines of which are described as follows:

BEGINNING at a point from which the Southwest corner of Parcel One bears due East, 20 feet; running
thence South 77.28 feet to the North line of the land conveyed to Bruce K. Davis et ux, by Deed, recorded April 26, 1955 as Instrument No. 6466, Humboldt County Records, and continuing South parallel to the East line of said Davis parcel 20 feet therefrom measured at right angles, 380 feet, more or less, to the North line of an existing 20-foot roadway;
thence South 88 degrees West along the North line of said 20-foot roadway, 565 feet, more or less, to the West line of Sections 13, Township 6 North, Range 1 East, Humboldt Meridian, said point being 292.2 feet North of the Southwest corner of the Northwest Quarter of Southwest Quarter of said section; and
thence South along said section line, 292.20 feet to the Southwest corner of the Northwest Quarter of Southwest Quarter of said section.

EXCEPTING THEREFROM that portion thereof lying within the lands conveyed to the State of California for highway purposes by Deed recorded March 11, 1963 in Book 727 of Official Records, Page 179.

continued...

EXHIBIT A
1998-2896-38

PARCEL FIVE:

That portion of the West Half of the Southwest Quarter of Section 13, Township 6 North, Range 1 East, Humboldt Meridian, described as follows:

A non-exclusive easement for ingress, egress and public utility purposes over the existing roadway through and across the land acquired by Cannon Dall Lumber Co., by the following Deeds:

(a) Deed from John D. Snider and wife, recorded June 10, 1949 under Recorder's file No. 5267, in the office of the County Recorder of said county.

(b) Deed from Bertha Munther, recorded June 10, 1949 under Recorder's File No. 5243, in the office of the County Recorder of said county.

(c) Deed from William A. Roberts and wife, recorded October 24, 1950 under Recorder's File No. 11119, in the office of the County Recorder of said county.

TRACT C:

PARCEL ONE:

The East 150 feet, measured at right angles to the East line of that portion of the Southwest Quarter of the Southwest Quarter of Section 13, Township 6 North, Range 1 East, Humboldt Meridian, described as follows:

BEGINNING on the North line of the Arcata and Mad River Railroad strip at the point where a projection Northerly of the West line of the land of Adolf Johnson and wife intersects said North line of said railroad strip;
thence Northerly on a projection of said Johnson's West line to the North line of said Southwest Quarter of Southwest Quarter;
thence East along said North line to the Northeast corner of said subdivision;
thence South along the subdivision line to the North line of said railroad strip;
thence Westerly along the North line of said railroad strip 650 feet to the point of beginning.

By the West line of the land of Adolf Johnson and wife, is meant the land conveyed to Adolf R. Johnson by Deed recorded in Book 170 of Deeds, Page 390.

PARCEL TWO:

A non-exclusive easement for ingress and egress over the following described parcel of land:

BEGINNING on the Northline of the former state highway at a point distant thereon South 82 degrees 30 minutes West 589 feet and South 89 degrees 06 minutes West 167 feet from the Westerly line of the Arcata and Mad River Railroad right of way in the South Half of the Southwest Quarter of said Section 13;

continued...

EXHIBIT A

thence along the North line of said highway North 89 degrees 06 minutes West 83.5 feet to the Southeast corner of the former M.C. Allen and wife land;

thence along the East line of said Allen land North 00 degrees 09 minutes West 318.5 feet to the South line of the Arcata and Mad River Railroad Co. right of way;

thence along said South line South 85 degrees 28 minutes East 74.83 feet;

and thence leaving said right of way and running South 01 degrees 52 minutes East 311.34 feet to the point of beginning.

PARCEL THREE:

A non-exclusive easement for ingress and egress upon and across the Easterly 30 feet of the following described land:

BEGINNING at the Southeast corner of the Northwest Quarter of the Southwest Quarter of said Section 13;

thence West along the subdivision line 570 feet;

thence Northeasterly in a straight line to a point on the East line of said Northwest Quarter of the Southwest Quarter which is distant thereon 764.21 feet Northerly from the point of beginning;

and thence South along the subdivision line 764.21 feet to the point of beginning.

PARCEL FOUR:

A 30 foot non-exclusive easement for ingress and egress along the Southerly boundary of that portion of the Southwest Quarter of the Southwest Quarter of said Section 13, described as follows:

BEGINNING on the North line of the Arcata and Mad River Railroad strip at the point where a projection Northerly of the West line of the land of Adolf Johnson and wife intersects said North line of said railroad strip;

thence Northerly on a projection of said Johnson's West line to the North line of said Southwest Quarter of Southwest Quarter;

thence East along said North line to the Northeast corner of said subdivision;

thence South along the subdivision line to the North line of said railroad strip;

thence Westerly along the North line of said railroad strip 650 feet to the point of beginning.

By the West line of land of Adolf Johnson and wife, is meant the land conveyed to Adolf R. Johnson by Deed recorded in Book 170 of Deeds, Page 390.

EXCEPTING THEREFROM that portion lying within Parcel One of Tract C.

continued...

EXHIBIT A

TRACT D:

PARCEL ONE:

BEGINNING on the quarter section line running East and West through the center of Section 13, in Township 6 North, Range 1 East, Humboldt Meridian, at a point which is distant thereon South 89 degrees 27 minutes East 625.2 feet from the West line of said section, said point being the Southeast corner of the parcel of land heretofore deeded to Edward H. Kelly and wife, by Deed dated March 1, 1957 and recorded March 15, 1957 as Recorder's File No. 4093;

thence North 0 degrees 50 minutes East along the East line of said parcel deeded to Kelly and wife, 418 feet, to the Northeast corner thereof;

thence South 89 degrees 27 minutes East, parallel to said quarter section line 34.8 feet to the West line of the Southeast Quarter of the Southwest Quarter of the Northwest Quarter of said Section 13;

thence North along said subdivision line 242 feet to the Northwest corner of said subdivision;

thence East along the subdivision line 660 feet to the Northeast corner of said subdivision;

thence South along the East line of said subdivision 660 feet to the quarter section line;

and thence West along the quarter section line, 694.8 feet to the point of beginning.

EXCEPTING FROM the above lands all oil, gas and other minerals, that may be in or under said above described land, together with the right of egress and ingress for the purposes of developing said minerals, all as reserved by Ogletree Lands Company in Deed recorded February 24, 1949, in Book 85 of Official Records, Page 35, Humboldt County Records.

PARCEL TWO:

A non-exclusive easement for ingress and egress over the North 40 feet of the Southwest Quarter of the Southwest Quarter of the Northwest Quarter of said Section 13, as conveyed by Deed from Richard N. Parker to Clarence Wabbel and wife, recorded December 31, 1958, in Book 516 of Official Records, Page 301, Humboldt County Records.

TRACT E:

PARCEL ONE:

BEGINNING at a point on the South line of the State Highway U.S. 299, as it existed on August 16, 1950, which is 44 feet wide, said point being North 29 degrees 38 minutes West, 976.8 feet from the South quarter section corner of Section 13, Township 6 North, Range 1 East, Humboldt Base and Meridian;

continued...

EXHIBIT A

thence Easterly along said South line of highway, North 82 degrees 26 minutes East, 171.0 feet;

thence South 7 degrees 34 minutes East, 200 feet to the North line of Arcata and Mad River Railroad right of way;

thence following same right of way line, North 89 degrees 57 minutes West, 172.5 feet;

thence following same on a curve to the right with a radius of 705 feet, a distance of 413 feet to the intersection of the North line of the railroad right of way and the South line of said Highway at a point 365 feet from the point of beginning;

thence North 82 degrees 26 minutes East, 365 feet to the point of beginning.

PARCEL TWO:

That land lying within the State Highway as it existed on August 16, 1950 lying directly North of Parcel One.

PARCEL THREE:

BEGINNING at a point which is the Northeast corner of a parcel of land sold by Scott Wolf to Bernard Kirsch, said point being 871.5 feet North and 313.5 feet West of the quarter corner on the South line of Section 13, in Township 6 North of Range 1 East, Humboldt Meridian, and running;

thence South 7 degrees 34 minutes East, 200 feet along East line of said Parcel of land sold by Wolf to Kirsch to North line of Arcata and Mad River Railroad;

thence along North line of said Arcata and Mad River Railroad, North 89 degrees 10 minutes East, 140 feet;

thence North 7 degrees 13 minutes West, 15 feet;

thence North 89 degrees 10 minutes East, 60 feet;

thence North 7 degrees 13 minutes West, 208.5 feet to South line of State Highway as it existed on June 14, 1951;

thence following South line of said highway, South 82 degrees 26 minutes West, 200 feet to the point of beginning.

EXHIBIT A

PTN S1/2 SEC 13 6N1E

516-1

1" = 200'

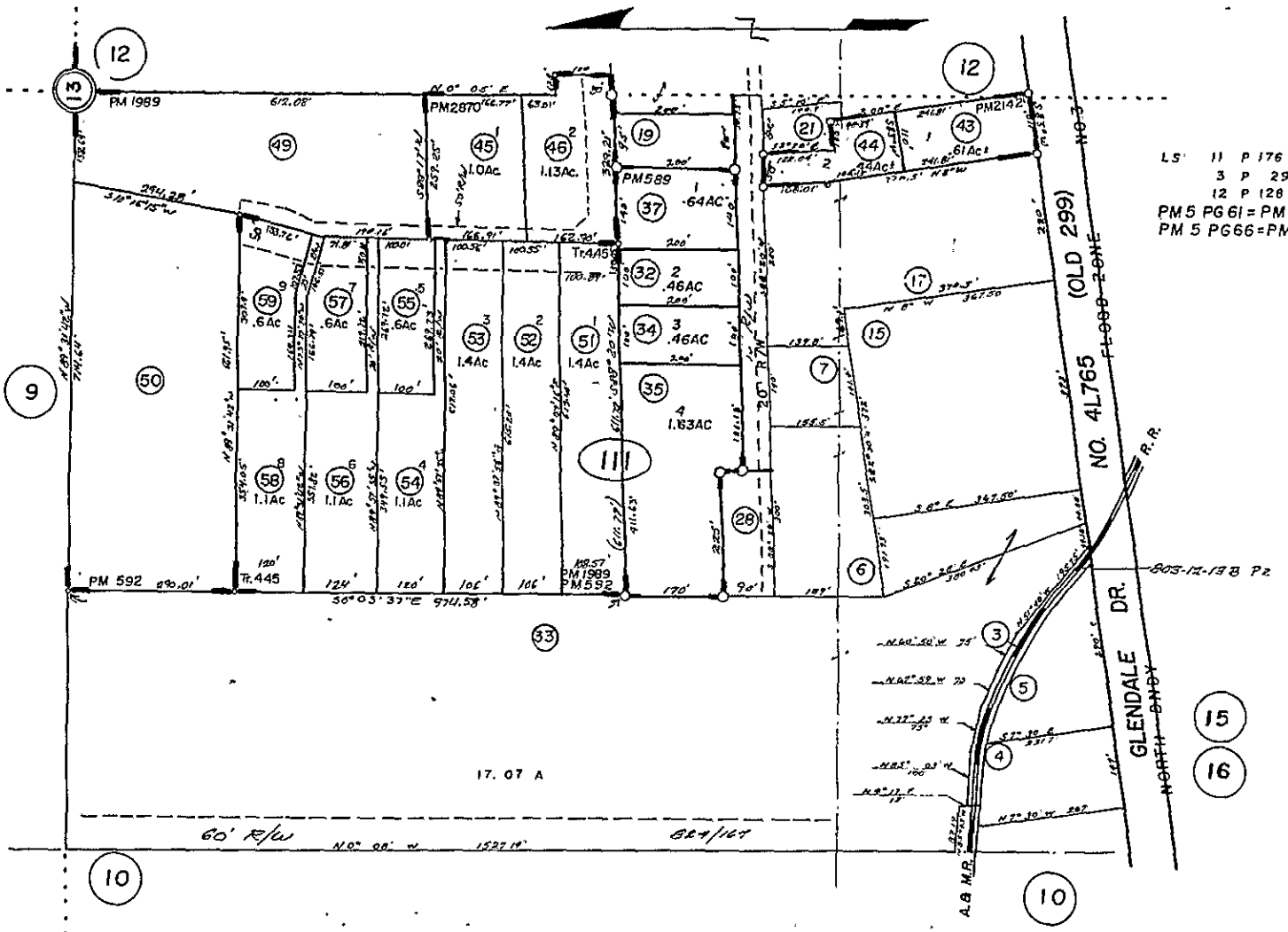


EXHIBIT A

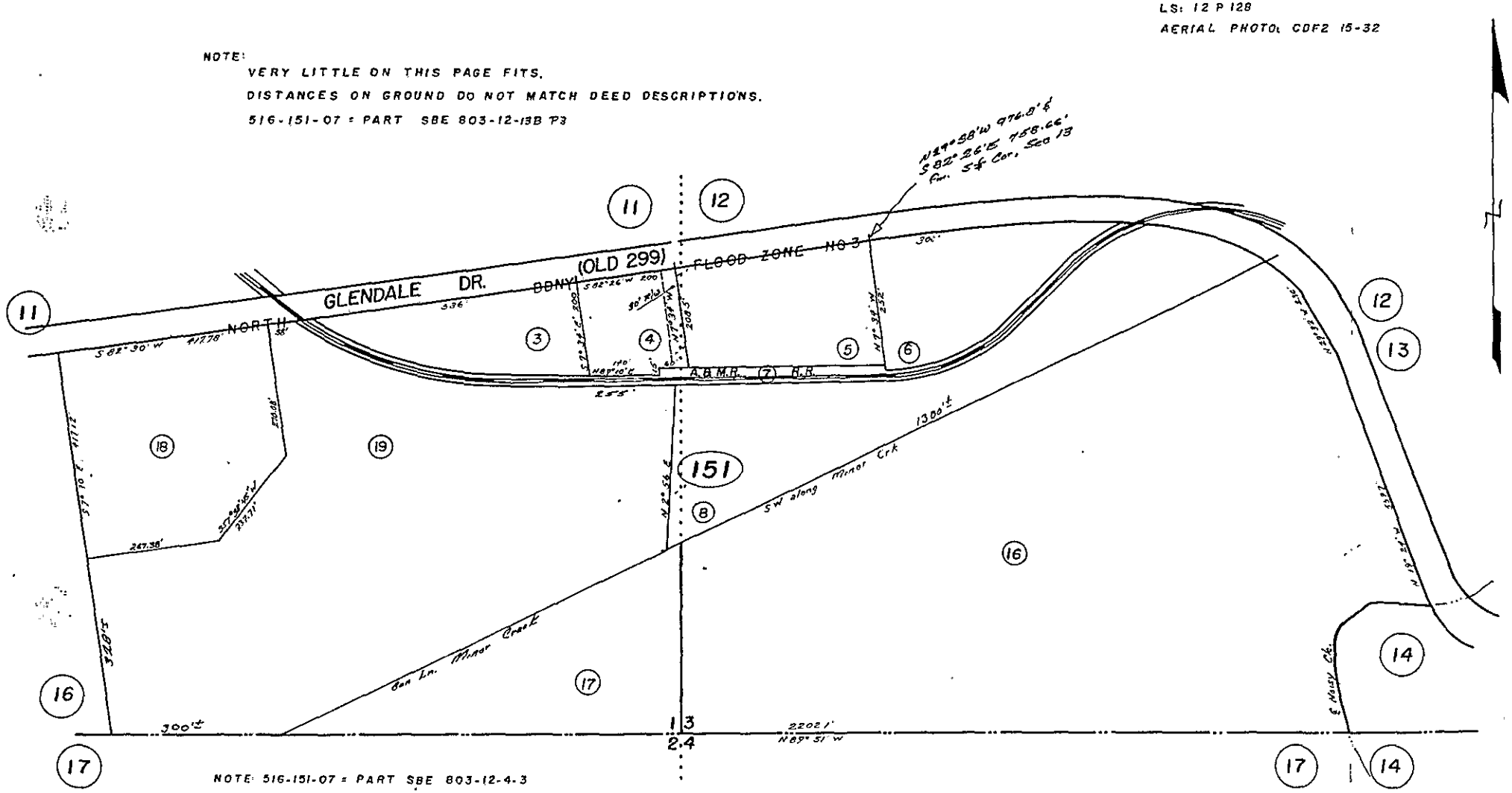
PTN S½ SEC 13, 6N1E

516-15

1" = 200'

LS: 12 P 128
AERIAL PHOTO: CDF2 15-32

NOTE:
VERY LITTLE ON THIS PAGE FITS.
DISTANCES ON GROUND DO NOT MATCH DEED DESCRIPTIONS.
516-151-07 = PART SBE 803-12-13B P3

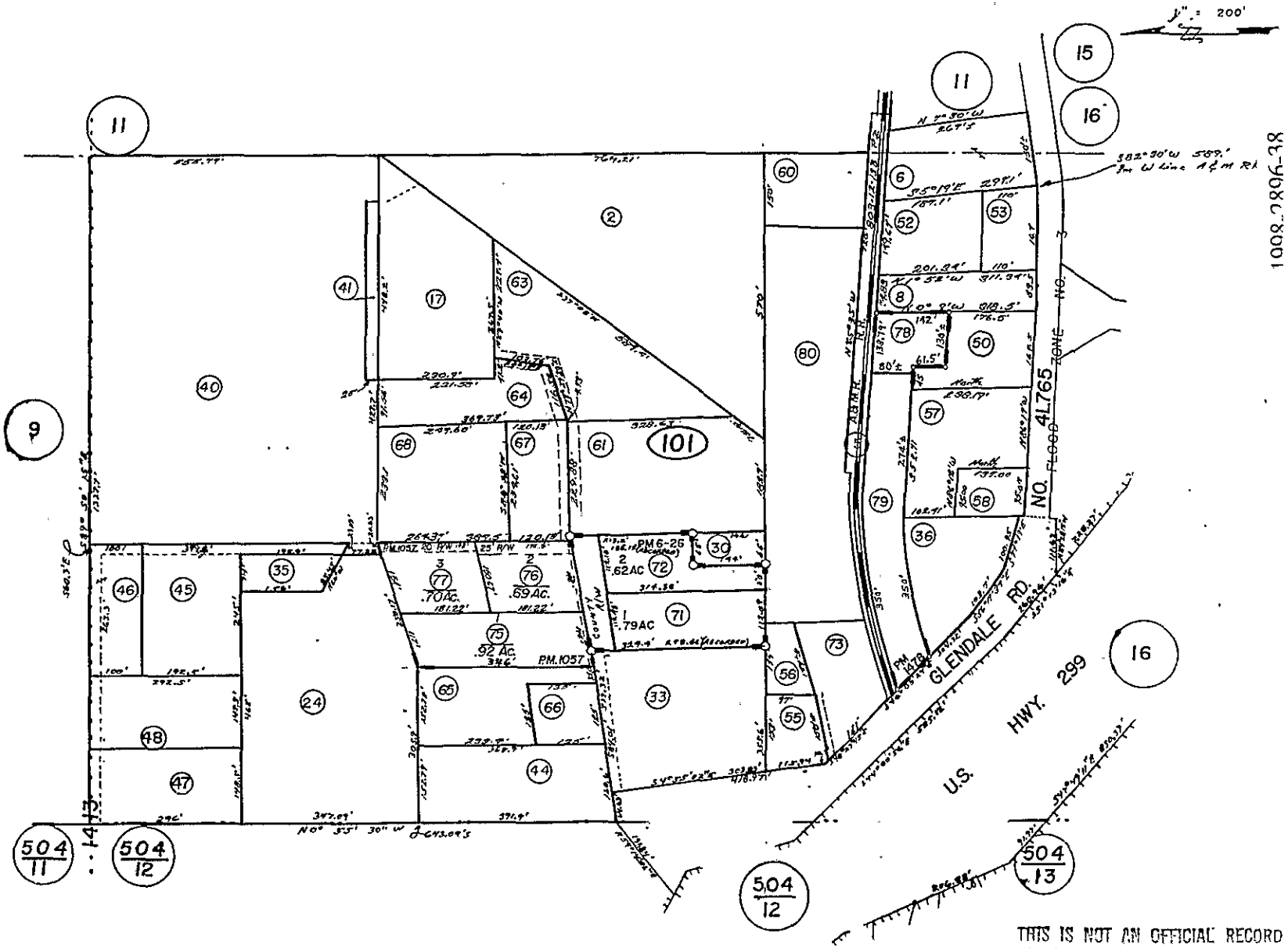


NOTE: 516-151-07 = PART SBE 803-12-4-3

EXHIBIT A

PTN SW1/4 SEC 13 6N1E

516-10



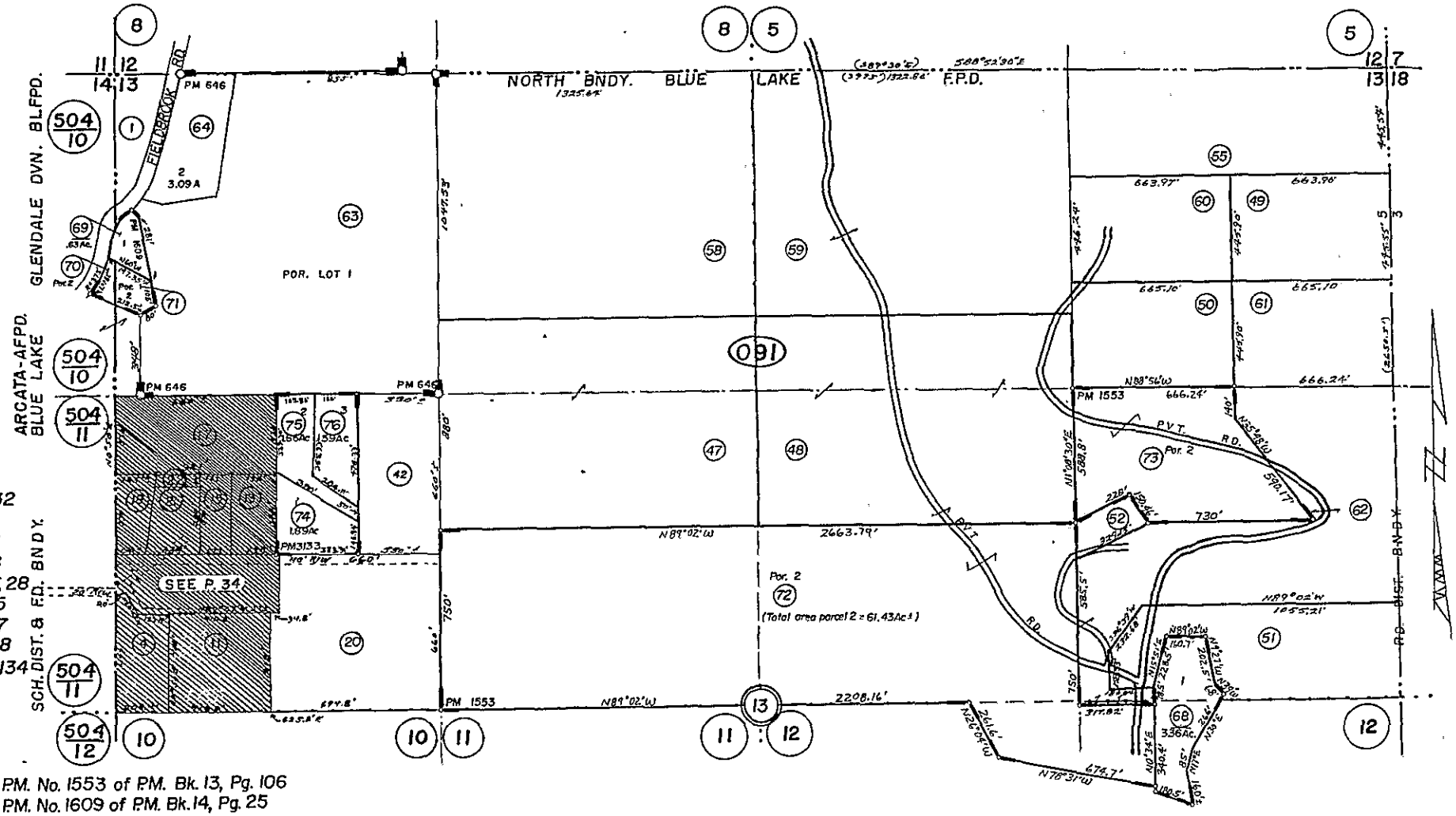
O.S. Bk. 3 Pg. 29
O.S. Bk. 11 Pg. 176
O.S. Bk. 12 Pg. 15
O.S. Bk. 12 Pg. 128
O.S. Bk. 28 Pg. 80
O.S. Bk. 29 Pg. 78
O.S. Bk. 6 Pg. 26 = PM 684
P.M. No. 1057 of P.M. Bk. 9, Pg. 76
P.M. No. 1478 of P.M. Bk. 13, Pg. 10

1008-2806-38

EXHIBIT A

N 1/2 SEC 13 6N 1E

516-09
T.C.A. 57-06
1" = 400'



O.S. 2A Pg. 32
O.S. 3 Pg. 29
O.S. Bk. 11 Pg. 176
O.S. Bk. 12 Pg. 128
O.S. Bk. 30 Pg. 27, 28
O.S. Bk. 30 Pg. 135
O.S. Bk. 30 Pg. 137
O.S. Bk. 30 Pg. 138
P.M. Bk. 5 Pg. 133, 134 (P.M. 646)

P.M. No. 1553 of P.M. Bk. 13, Pg. 106
P.M. No. 1609 of P.M. Bk. 14, Pg. 25
PM No 3133 of PM Bk 29 Pgs 48—49

EXHIBIT A

96-656-2.a

EXHIBIT B

LEGAL DESCRIPTION
(Green Chain Area)

All that real property located within the Southwest Quarter of Section 13, Township 6 North, Range 1 East, Humboldt Meridian, County of Humboldt, State of California, described as follows:

BEGINNING at the Southeast corner of the Southwest Quarter of said Section 13, monumented on the ground with a 2½" brass cap on an iron pipe stamped "LS 2020" as set on the survey in Book 12 of Surveys, page 128, Humboldt County Records; thence, North 46 degrees 33 minutes 35 seconds West. 1,640.76 feet to the True Point of Beginning;

THENCE. North 01 degree 00 minutes 00 seconds East, 90.00 feet;
THENCE. North 89 degrees 00 minutes 00 seconds West, 165.00 feet;
THENCE. South 46 degrees 00 minutes 00 seconds West, 21.21 feet;
THENCE. South 01 degree 00 minutes 00 seconds West. 60.00 feet;
THENCE. South 44 degrees 00 minutes 00 seconds East, 21.21 feet;
THENCE. South 89 degrees 00 minutes 00 seconds East, 165.00 feet to the True Point of Beginning.

Bearings for the above described land are based on Book 39 of Surveys, page 11-13. Humboldt County Records.

This real property description has been prepared by me or under my direction in conformance with the Professional Land Surveys Act on February 25, 1997.

Kenneth J. Omsberg, Jr. LS 4446
Expires 9-30-97

LICENSED LAND SURVEYOR
KENNETH J. OMSBERG, JR.
No. 4446
Exp. 9-30-97
STATE OF CALIFORNIA

1998-2896-38

(35)

EXHIBIT B

96-656-2.b

EXHIBIT C

LEGAL DESCRIPTION
(Dip Tank Building)

All that real property located within the Southwest Quarter of Section 13, Township 6 North, Range 1 East, Humboldt Meridian, County of Humboldt, State of California, described as follows:

BEGINNING at the Southeast corner of the Southwest Quarter of said Section 13, monumented on the ground with a 2½" brass cap on an iron pipe stamped "LS 2020" as set on the survey in Book 12 of Surveys, page 128, Humboldt County Records; thence, North 20 degrees 07 minutes 59 seconds West, 771.11 feet to the True Point of Beginning;

THENCE, North 07 degrees 30 minutes 00 seconds West, 79.02 feet;
THENCE, South 82 degrees 30 minutes 00 seconds West, 85.84 feet;
THENCE, South 07 degrees 30 minutes 00 seconds East, 68.00 feet;
THENCE, North 89 degrees 49 minutes 00 seconds East, 86.54 feet to the True Point of Beginning.

Bearings for the above described land are based on Book 39 of Surveys, page 11-13, Humboldt County Records.

This real property description has been prepared by me or under my direction in conformance with the Professional Land Surveys Act on February 25, 1997.

Kenneth J. Omsberg, Jr. LS 4446
Expires 9-30-97

LICENSED LAND SURVEYOR
KENNETH J. OMSBERG, JR.
LIC. 4446
EXP. 9-30-97
STATE OF CALIFORNIA

1998-2896-38

(36)
EXHIBIT C

BROWN AND CALDWELL

November 24, 1997

Ms. Linda S. Mackey, President
EnviroNet Consulting
3601 Regional Parkway, Suite A
Santa Rosa, CA 95403

3872-01.5

Subject: Concrete Slab Design

Dear Ms. Mackey:

The purpose of this letter is to formalize some of the discussions we have had recently in regard to the concrete slab designed and installed at the Blue Lake Forest Products facility in Arcata, California. As you are aware, the basis of design changed verbally several times during the initial planning stages and negotiations with parties. A high degree of conservatism was used in the design process because of uncertainty at that time: 1) we were not able to obtain direct soil strengths characteristics, 2) a request to bury impacted materials under the slab may create a void, and 3) because slab loading changes were not consistent.

The initial bases of design included a 150,000-pound loader (Cat 988) with 70/30 Axle Load distribution. That loading condition set the stage for the slab thickness and initial reinforcing steel; However, the critical design criteria was the assumption that a 27-foot wide by 180 feet long void would exist under the center portion of the slab. That void did not materialize, in fact the burial pit was 10 feet by 18 feet in plan dimension located at the western end of the slab. In addition, the buried material were encased in concrete.

Another important factor in the design is the modulus of subgrade reaction and not having real data, we assumed it to be 25-pci (worse case scenario) during design. Just prior to construction, we confirmed that the modulus is closer to 70 pci, due to timing and the pre-approval, we did not change the design. Because we were informed that loads would be reduced to the green chain loading and light vehicle traffic, and a canopy would be placed over the slab limiting a loader access, we used the green chain loads provided by Anvick and nominal (Caltrans H-20) wheel loading in our final design calculations. A load limit was used so that uncontrolled slab loading would not occur and that in the event higher loading were anticipated, a structural engineer would have the opportunity to review the situation for conformance with the intent of the design (Letter dated August 15, 1997). Notes on the

EXHIBIT

drawings (Sheet S1, reviewed by all parties prior to construction) clearly indicate the H-20 loading limit.

There is no doubt that the slab can adequately support higher loading and the 56,620 pound forklift suggested in the information provided. Based on the data accumulated to date and professional judgement, the 56,620 pound should be considered the maximum allowable load without further calculation.

If you have any further questions regarding the slab design, please contact me at (510) 210-2510.

Very truly yours,

BROWN AND CALDWELL

Lenard D. Long, P.E.
Manager, Environmental Services

LDL:paa

EXHIBIT I

Site Safety Plan 2

Site Safety Plan

Royal Gold, LLC
1689 Glendale Drive
Glendale, California

Prepared for:

Royal Gold, LLC

October 2021

016098.003

Phone: (707) 441-8855 **Email:** info@shn-engr.com
Web: shn-engr.com • 812 W. Wabash Ave. Eureka, CA 95501-2138

Site Safety Plan

Royal Gold, LLC
1689 Glendale Drive
Glendale, California

Prepared for:
Royal Gold, LLC

Prepared by:

812 W. Wabash Ave.
Eureka, CA 95501-2138
(707) 441-8855

October 2021

QA/QC: RMR

Reference: 016098.003

Table of Contents

Table of Contents, Continued

List of Illustrations

Abbreviations and Acronyms

Units of Measure

mg/kg	milligrams per kilogram
mg/m^3	milligrams per cubic meter
ppm	parts per million
µg/L	micrograms per liter

Additional Terms

APR	air purifying respirator
BGS	below ground surface
Cal/OSHA	California Division of Occupational Health and Safety
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
COCs	constituents of concern
DTSC	California Department of Toxic Substances Control
IDLH	immediately dangerous to life and health
IIPP	injury and illness prevention plan
LUC	land use covenant
O&M	Operations and Maintenance
OSHA	United States Occupational Safety and Health Administration
PCP	pentachlorophenol
PID	photoionization detector
PPE	personal protective equipment
RAP	remedial action plan
SGMP	soil and groundwater management plan
SSP	site safety plan
SSO	Site Safety Officer
SSS	Site Safety Supervisor
TCP	tetrachlorophenol
VOCs	volatile organic compounds

General Information

Project:	Royal Gold, LLC	**Site Address:**	1689 Glendale Drive, Glendale, CA
Site Phone:	(707) 822-4653	**Date:**	August 2021
Plan Prepared By:	Roland Rueber	**Client:**	Royal Gold, LLC

Key Personnel and Responsibilities

As the work at the site has many aspects, the Site Safety Supervisor (SSS) and Site Safety Officer (SSO) should be selected for each activity. An example form is included in Appendix 1.

1.0 Introduction

This site safety plan (SSP) was prepared by SHN for the Royal Gold soil manufacturing operation in the unincorporated community of Glendale, Humboldt County, California. The Royal Gold facility's location is SW ¼, Section 13, T6N, R1E, H.B. & M. Arcata North 7.5-minute United States Geological Survey (USGS) quadrangle at 40.900839° N latitude and -124.022139° W longitude. Elevations at the project site vary from approximately 90 to 125 feet above mean sea level.

The project area has been used for industrial purposes since the 1940s. Several lumber mills operated on the site under different owners until 2002, when the last owner filed for bankruptcy and a large portion of the mill was demolished. Given the site history, there is a potential for encountering soils and/or groundwater with elevated concentrations of chlorinated solvents, pentachlorophenol (PCP), tetrachlorophenol (TCP), dioxins/furans, volatile organic compounds (VOCs), or petroleum hydrocarbons. The site regulatory history is discussed in further detail in Section 4.0 Regulatory Background.

In March 2009, the current occupant, Royal Gold, moved onto the site to conduct a soil manufacturing operation. Royal Gold, LLC is currently in the process of obtaining a Conditional Use Permit and Special Permit from the County of Humboldt and is proposing several improvements at the site over the next few years. These improvements include, but are not limited to, new buildings, additional paving, stormwater improvements, utility infrastructure, and a wetland mitigation area.

This SSP is designed to provide health and safety guidelines for the protection of employees that are involved with construction activities at the project site, specifically the implementation of the August 2021 Soil and Groundwater Management Plan (SGMP) (SHN, 2021). The primary goal of this SSP is to establish general site safety requirements to limit personnel exposure to potentially hazardous materials. It is pertinent that site personnel and visitors read and understand the SSP prior to entering the construction areas. Data generated from implementation of the August 2021 SGMP will be evaluated, and this SSP shall be revised as necessary based on concentrations reported for the constituents of concern (COCs) at the site.

General United States Occupational Safety and Health Administration (OSHA) requirements pertaining to the operation of equipment, including loaders and excavators, will be followed at the project site at all times. This SSP provides limited specific safety guidelines for general construction activities or heavy equipment operations.

2.0 Subcontractors

Subcontractors will operate under their own OSHA-required injury and illness prevention program (IIPP). Subcontractors must meet the requirements of the SSP and may also become responsible for preparing an SSP as applicable to their specialized scope of work. Their SSP must be relative to their scope of work and provide for the means and methods ensuring the health and safety of the subcontractor's employees and property. Royal Gold, LLC does not assume the responsibility for the safe work practices of a subcontractor's employees. Royal Gold, LLC is not responsible for cleanup of any hazardous materials released to the environment that are brought onsite and used by the contractor or sub-contractor, and the release is caused by the contractor or sub-contractor.

Site workers will typically report to the project manager listed in the SSP and shall also follow the direction of the Site Safety Supervisor (SSS), or other SSP field personnel if the SSS is not present on site. If the SSS is not present onsite, and unsafe or hazardous conditions are discovered, the site workers (Subcontractor) are to immediately notify the SSP project manager and/or other listed key personnel by phone.

3.0 Hazard Analysis

___	Serious	___	Impoundment	___	Active
X	Moderate	___	Landfill (former)	X	Inactive
___	Low	___	Open,	___	Unknown
___	None	X	Other Former lumber mill		

___	Gas	X	Toxic	X	Dust
X	Groundwater	X	Corrosive	X	Liquid
___	Sludge	___	Ignitable	___	Fumes
X	Solid, sediment	X	Volatile	X	Vapors
___	Unknown	___	Radioactive	X	Contact
___	Other	___	Reactive	X	Respiratory
		X	Unknown, (pending investigation)	X	Particulates
		___	Other	___	IDLH[1]

4.0 Regulatory Background

The M&P site, which operated on the Royal Gold facility, was used as a lumber mill from the late 1940s until ceasing operations in 2002. Beginning in April 1967, approximately eight percent of the rough green lumber was treated by immersion in a chemical fungicide containing PCP and TCP for the purpose of preventing mold and fungal growth. From April 1967 to May 1984, this chemical fungicide was applied

[1] IDLH: immediately dangerous to life and health

to processed lumber in dip tanks in an area known as the green chain. The green chain area consisted of a conveyor system that was used to move lumber and included the original dip tanks where lumber was submersed in a PCP solution.

Spillage and drippings of the wood solutions are believed to have caused PCP and TCP contamination of the soil and groundwater in this area. The contamination is believed to have occurred during the ownership and operation under Molalla-Arcata (1950 to 1969) and M&P (1969 to 1984). In June 1981, a PCP spill occurred at the green chain building. Between August and December 1981, the dip tank operation at the green chain was dismantled and a new dip tank was installed in an existing building on the southern end of the Site, just south of Glendale Drive. Untreated lumber was dipped in a PCP-based solution at this location until M&P ceased operations after filing for bankruptcy in 1985.

From 1987 through 1989, remedial investigations were conducted by the M&P bankruptcy trustee under the oversight of Department of Health Services (DHS). The remedial investigation focused on five areas of potential contamination on the Site. However, it was determined that only the green chain area had significant levels of contamination. In March 1989, DHS issued a Remedial Action Order to M&P requiring M&P to determine the nature and extent of the release at the Site, characterize the Site, prepare a remedial action plan (RAP), and conduct remediation of the Site. In December 1994, DTSC approved a RAP for the Site. The RAP included consolidation of contaminated soils and placement of a cap over the soils in the green chain area to prevent PCP and TCP detected in the soil from being discharged to the groundwater beneath the Site and to surface waters draining from the Site. This was completed by March 1998.

A land use covenant (LUC) was recorded with Humboldt County in February 1998. A copy of the LUC is included in the August 2021 SGMP. The LUC requires maintenance of the cap in the green chain area as well as maintenance of the concrete slab floor where the new dip tank was installed in the southern property building. DTSC certified completion of appropriate remedial actions at the Site in March 1998. The site was still subject to ongoing operation and maintenance activities. Blue Lake Forest Products, Inc. was still operating the Site in March 1998.

A “Covenant to Restrict Use of Property” was executed between M&P; Blue Lake Forest Products, Inc.; and DTSC in February 1998, and a land use restriction was recorded with the Humboldt County Assessor in March 1998 (DTSC, 1998). The LUC designates two restricted areas at the former mill site: the portion of the property where the concrete protective cover was installed over the former green chain (the Cap, Figure 2 from August 2021 SGMP) and the portion of the former mill where the concrete slab floor of the unit dip tank building is located (Concrete Slab Restricted Area). The Concrete Slab Restricted area is located south of Glendale drive, and that area is not part of the Royal Gold facility. Contaminated soils containing PCP, TCP, dioxins, and furans lie beneath the Cap and the Concrete Slab Restricted Area. The LUC restricts the use of the Cap and the Concrete Slab Restricted Area to commercial industrial activities and prohibits the building of residences, hospitals, daycares, or schools for persons under 21 years. The LUC requires that the integrity of the Cap and Concrete Slab Restricted Area be maintained and contaminated soil beneath the Cap and Concrete Slab Restricted Area not be disturbed without a soil management plan previously approved by DTSC for that specific area.

In April 2002, Blue Lake Forest Products, Inc. ceased operations at the Site and filed for bankruptcy. With the completion of the bankruptcy in February 2003, Blue Lake Forest Products, Inc. was ordered by the bankruptcy court to continue the operation and maintenance at the Site as required by the DTSC-approved Operations and Maintenance (O&M) agreement dated August 15, 1997. Blue Lake Forest

Products, Inc. did continue to monitor the groundwater and inspect the cap. The last time Blue Lake Forest Products, Inc. conducted groundwater monitoring and the annual Cap inspection was in 2005. From November 2014 to November 2019, six groundwater monitoring sampling events have occurred. Groundwater samples were analyzed for PCP and TCP for six groundwater monitoring events. Monitoring wells MW-7, MW-8, MW-9, and MW-10 had no detections of PCP or TCP for all six monitoring events. MW-11 had a single detection of PCP in May 2017 at 1.9 micrograms per liter (µg/L). MW-12 had its highest detections of PCP during the May 2016 sampling event at 120 µg/L. MW-1 had its highest detection of PCP during the August 2019 sampling event at 1,200 µg/L.

Soil samples were collected by URS Corporation in November 2011 and April 2012 within the foundation of the former sawmill building which lies immediately east of the Cap. Five borings were advanced to depths of 15 feet below ground surface (BGS). PCP was detected at 1.8 milligrams per kilogram (mg/kg) at 3 feet BGS and at 2.2 mg/kg at 6 feet BGS in boring EB-12 during the November 2011 sampling event. PCP was detected at a maximum concentration of 40 mg/kg at EB-18 at 6 feet BGS during the April 2012 sampling event.

DTSC issued a Decertification on December 28, 2018, rescinding the March 9, 1998, Remedial Action Certification. DTSC stated that the remedy selected in the 1994 RAP was no longer protective for the following reasons: rising groundwater level has mobilized PCP/TCP in soil beneath the green chain area; surface water can percolate through PCP/TCP-impacted soil present below the former sawmill as the area is partially unpaved and/or covered with a building foundation in poor condition; and PCP/TCP can migrate offsite in groundwater or surface water runoff across the former sawmill area. The current DTSC investigation is ongoing. Additional data collected by DTSC regarding soil, groundwater, or surface water will be reviewed and considered in implementation of this SSP. SHN recommends that the Envirostor website be reviewed by the SSS when subsurface work at the facility is proposed as there is the potential for reporting of data more current than available at the time of the preparation of this document.

5.0 Hazard Assessment: Contaminants of Concern

The potential COCs at the site following review of historical sampling data include the following:

Soil

- Chlorinated Solvents
- PCP
- TCP
- Dioxins/furans
- VOCs
- Petroleum hydrocarbons

Groundwater

- Chlorinated Solvents
- PCP
- TCP
- Dioxins/furans
- VOCs
- Petroleum hydrocarbons

6.0 Activity Description

Work activities with potential for COC exposure to employees includes:

- Excavation of shallow test pits, grading for foundation footprints, wetland mitigation, stormwater features, and paving, installation of below grade utility lines, and security lighting and fencing
- Soil sample collection during pre-characterization and stockpiling
- Fugitive dust during construction activities
- Groundwater sample collection or dewatering excavations (if encountered)
- Investigation derived waste handling

7.0 Dust Suppression and Air Monitoring for Dust

Although the existing concentration of the contaminants of concern in project soils may pose a hazard to employees if proper hygiene practices are not followed, the inhalation potential is low, given that dust suppression is adequate. As such, either a qualitative or a quantitative approach to air monitoring may be selected:

- **Air Monitoring Qualitative Approach**: Control dust to maintain no airborne dust emissions (concentration approximately 2 milligrams per cubic meter [mg/m^3]), as monitored visually continuously by the SSO.
- **Air Monitoring Quantitative Approach**: Control dust to maintain concentrations less than the project action level for total dust (5 mg/m^3), as measured with a real-time instrument.

With either approach, soil dust control is a project requirement. This shall include, but is not limited to, implementation of the measures required in the Facility Dust Mitigation and Housekeeping Plan required as part of the Permit to Operate (NCU 472-12) issued to Royal Gold by the North Coast Unified Air Quality Management District. If, during the course of handling debris pile materials, visible dust is emitted, work shall cease, and effective dust suppression techniques shall be immediately implemented. It is important to note that dust disturbed by vibrations from power tools, discharged air from pneumatic equipment, or during cleanup and handling waste may contain COCs.

Quantitative air monitoring may be conducted in real-time for airborne dust concentrations using an aerosol monitor, such as a DUSTTRAK™ Aerosol Monitor Model 8520, or equivalent to assess the concentration of suspended particulate matter in the air. If used, the monitor shall be calibrated according to the manufacturer's specifications. At no point during the course of the project should suspended particulate matter in the air exceed 5 mg/m^3.

If the airborne concentration of dust is visible (qualitative air monitoring method) or exceeds a project action level of 5 mg/m^3 (quantitative air monitoring method) the project personnel with appropriate responsibility and authority shall stop work until dust concentrations are reduced beneath the project action level. Real time measurements or visual observations for suspended particulate matter shall be recorded on the data form in Appendix 2.

8.0 Monitoring for Volatile Organic Compounds

Real time measurements will be taken in the breathing zones of the personnel in the work area. A photoionization detector (PID) shall be used on a daily basis to monitor site air and soil for potential exposure to volatile organic compounds during times of soil disturbance.

An action level of 10 parts per million (ppm) has been chosen for this site. If the PID reads 10 ppm of total organic vapors, work shall cease, and the area shall be secured. The SSS must notify the SSP project manager and the industrial hygienist.

9.0 Personal Protective Equipment

Level of Protection: A _____ B _____ C _____ D X

Level D work includes any work performed at this site. If the action levels are reached, upgrade to a full or half-face air purifying respirator (APR) with organic vapor and dust/mist filter cartridges.

Level D, Modified

- Steel toe boots
- Chemically-resistant gloves (nitrile)
- Safety glasses
- Hard hat
- Safety vest, for traffic and heavy equipment safety
- Tyvek® suits, as needed to protect from potentially contaminated soils
- Face shield, if potential for splash hazard

Boots, gloves, and protective clothing will be used to prevent direct contact with potential contaminants in the piles and ambient air, and these will provide a simple method of personal decontamination after fieldwork has been completed.

Employees and the project subcontractors will meet the minimum level of personal protective equipment (PPE) specific to the job task when entering or working in an area of known contamination. If the level of contamination is unknown, the maximum level of PPE will be donned prior to entering the suspected contamination zone. Once appropriate site monitoring has been conducted to determine the level of contamination present, the level of PPE may be reduced, as appropriate. If known or suspected conditions require an increase in the level of PPE in the contamination zones or newly designated contamination zones, all field activities will immediately cease until the appropriate changes in PPE are made.

10.0 Employee Training

It is the responsibility of all contractors and subcontractors to be current in the training required by the California Division of Occupational Health and Safety (Cal/OSHA) Hazard Communication Standard (Title 8 California Code of Regulations [CCR] 5194). As with many other hazards associated with construction, the contractors are required to provide health and safety hazard training for the work being performed. Training topics to be covered should include:

- Applicable Hazard Reduction Controls
- Contents of this SSP
- Required Personal Hygiene Practices
- Safe Use of Hazardous Materials or Products
- Safe Use of Personal Protective Equipment, including Respiratory Protection

11.0 Physical Hazards

The physical hazards that are associated with the project site include grading of surfaces, excavation, construction of new buildings and utilities, excess noise, proximity to the operation of heavy equipment, and the use of heavy equipment. Personnel should exercise caution, use proper lifting techniques, use proper material handling techniques, and pay attention to tight quarters. During heavy equipment operations, proper care should be exercised in the physical placement and location of site personnel. Clothing articles that are worn by site personnel should be reasonably close fitting and have no loose or hanging items attached.

Potential hazards exist from moving equipment, installation of construction materials, falling objects, uneven working surface, stored energy, as well as from hearing impairment and communication difficulties that are associated with the operation of heavy equipment. An effective method of communication should be established prior to commencement of field activities.

If any subcontractor does not know how to control these hazards, contact the SSS PRIOR TO INITIATING WORK AT THE SITE.

12.0 Heavy Equipment Safety

Employees and subcontractors will minimize hazards associated with heavy equipment operation by working with heavy equipment operators to implement the following work practices:

- Safety vests and hard hats will be worn by personnel.
- Site visitors will be advised of site hazards associated with heavy equipment operations.
- Site workers will stay out of the reach of heavy equipment operations.
- Employees shall not place any part of their bodies outside the running lines of equipment/trucks or other parts of the equipment where shear or crushing hazards exist.
- Site workers will communicate with equipment operators to let them know the locations of potential hazards and personnel.
- Equipment shall not be operated in areas that expose the operator to the hazard of collision with overhead obstructions.
- Drivers/operators shall inspect the equipment at the start of each shift to ensure its safe operation and functioning systems.
- No equipment shall be operated with a leak in its fuel system.
- Only drivers authorized by the employer and trained in the safe operations of heavy equipment or trucks shall be permitted to operate such equipment.
- Drivers shall look in the direction of travel and shall not move a vehicle until certain that persons are in the clear.

- Equipment/vehicles shall not be driven up to anyone standing in front of a fixed object of such size that the person could be caught between the equipment/vehicle and the object.

13.0 Housekeeping

The site shall be kept clean. Employees and the subcontractor(s) shall make coordinated efforts to keep the site clean of debris and used equipment that may create a safety hazard. The following procedures shall apply:

- Ample lighting shall be provided if working in low light.
- Work areas will be kept free of tripping hazards to the degree possible.
- Means of access and egress will be kept clear.

14.0 Electrical Safety

The SSS or SSO shall communicate with contractors that electrical wiring or extension cords shall be placed in non-traffic and/or non-heavy equipment operating areas. If wiring must be routed through such areas, it shall be installed with a clearance of not less than 16 feet to allow the safe passage of vehicles and heavy equipment. Wiring shall not be placed in decontamination areas or other areas where water may pose the risk of electric conductivity on wetted ground or other shock hazards.

15.0 Fire Response Equipment

Fire extinguishing equipment meeting the requirements of 29 Code of Federal Regulations (CFR) 1910 Subpart L will be on hand and ready to use to control incipient fires. All vehicles used on a project site will be equipped with a portable fire extinguisher.

Portable fire extinguishers will meet the requirements of 29 CFR 1910.157 with particular attention paid to ensure that it is:

- Appropriate to the potential fire hazard at the site
- Operable and fully charged
- Regularly inspected, maintained, and tested
- Visible, identifiable, and accessible (within 50 feet of an employee, and unobstructed at the work site)

In making a selection from available incipient fire control resources, the classification of the potential fire hazard will direct the appropriate choice. Portable fire extinguishers may be appropriate for a single class of fires or a combination of classes of fires.

16.0 Heat Stress Illness

Heat stress can be a potential hazard when field activities are conducted during periods of warm weather. In addition, heat stress can be accentuated when chemical protective clothing and equipment are worn by site personnel. If not prevented, heat stress can result in illness.

16.1 General Prevention of Heat Stress Illnesses

- Rest in shaded areas
- Stay hydrated
- Avoid vigorous physical activities in hot and humid weather
- At work, if you must perform physical activities in hot weather:
    - Drink plenty of fluids
    - Avoid alcohol, coffee, and tea, which may lead to dehydration
    - Take frequent mini-breaks to hydrate yourself

16.2 Provision of Water

Employees are encouraged to drink water frequently. Water shall be "fresh, pure, suitably cool, and provided to employees free of charge." The water shall be located as close as practicable to the areas where employees are working and be readily available.

- Site Safety Supervisors are responsible to ensure employees have an adequate supply of drinking water.
- Site Safety Supervisors shall encourage the frequent consumption of small quantities of water, up to 4 cups per hour, when the work environment is hot, and employees are likely to be sweating more than usual in the performance of their duties.
- Drinking water will be provided in sufficient quantities to provide one quart per employee per hour for the entire shift (at least 2 gallons per employee for an 8-hour shift).
- If there are effective procedures for replenishing the water supply during the shift, a minimum of 2 quarts of water per employee may be provided at the beginning of the shift.

16.3 Shade and Rest

A shaded area will be provided when the temperature exceeds 80 degrees Fahrenheit. The amount of shade present shall be at least enough to accommodate the number of employees on recovery or rest periods, so that they can sit in a normal posture fully in the shade without having to be in physical contact with each other. The shade shall be located as close as practicable to the areas where employees are working. Subject to the same specifications, the amount of shade present during meal periods shall be at least enough to accommodate the number of employees on the meal period who remain onsite. The shaded area shall be open to the air or ventilated and cooled and access shall be permitted at all times. Canopies, umbrellas, or other temporary structures may be used to provide shade, provided they block direct sunlight.

Site Safety Supervisors are responsible for the following tasks:

- Ensuring that employees have access to shaded or air-conditioned areas (such as a break room) to prevent or recover from heat illness symptoms or to take rest breaks
- Emphasizing the importance of taking recovery or rest periods

In the event an employee feels discomfort from the heat, accommodate a preventative cool-down rest to allow the employee to cool down and prevent the onset of heat illness.

An individual employee who takes a preventative cool-down rest shall:

- Be monitored and asked if he or she is experiencing symptoms of heat illness.
- Be encouraged to remain in the shade.
- Not be ordered back to work until any signs or symptoms of heat illness have abated, but in no event less than 5 minutes in addition to the time needed to access the shade.

16.4 High-Heat Procedures

High heat procedures (when temperatures exceed 95 degrees Fahrenheit) are not expected to be required at this project site.

16.5 Responding to Heat Illness Emergencies Employee Procedures

Any employee who recognizes the symptoms or signs of heat illness in themselves or in coworkers should immediately report this condition to the SSS. When you recognize signs of heat illness in yourself or in a co-worker:

- Move them to a shaded area for a recovery period of at least 5 minutes.
- If the condition appears to be severe or the employee does not recover, then emergency medical care is needed.
- Immediately report to your supervisor any symptoms or signs of your heat illness you may be experiencing or observing in a co-worker.
- Call 911 if supervisor is not readily available.

16.5.1 Site Safety Supervisor Procedures

Site Safety Supervisors shall:

- Carry cell phones, radios, or other means of communication ensuring emergency services can be called, and verify the radios or other means of communication are functional prior to each shift.
- Know the exact work locations and have clearly written and precise directions to the work site for emergency responders.
- Conduct pre-shift meetings before the commencement of work to review the high heat procedures, encourage employees to drink plenty of water, and remind employees of their right to take a cool-down rest when necessary.

16.5.2 Emergency Contact Procedures

- Call 911.
- Be ready to provide emergency response personnel with directions to work location.
- When working at remote locations, you must be able to provide concise directions to emergency response personnel.

16.6 Response to Heat Stroke Symptoms

- Victims of heat stroke must receive immediate treatment to avoid permanent organ damage.

- Always notify emergency services (911) immediately. If their arrival is delayed, they can give you further instructions for treatment of the victim.
- If possible, get the victim to a shady area to rest.
- Remove heavy clothing or change to lightweight clothing.
- Cool the victim; effective cooling measures include:
    - Administering cool, non-alcoholic beverages
    - Applying cool or tepid water to the skin (for example you may spray the victim with cool water from a garden hose)
    - Providing a cool shower or sponge bath
    - Moving victim to an air-conditioned environment or fanning the victim to promote evaporation
    - Placing ice packs under armpits and groin
    - Monitoring body temperature with a thermometer and continuing cooling efforts until the body temperature drops to 101-102 degrees Fahrenheit

17.0 Site Control

To the extent feasible, personnel, equipment, and the decontamination station shall be located upwind of any suspected or known sources of contamination. During field activities, the project site will be divided into three basic areas: a contamination zone, a contamination reduction zone, and an uncontaminated zone. The uncontaminated zone will include all area(s) of the project site that can be documented as not containing any detectable levels of contamination by the selected methods of site monitoring that are presented in this SSP. At the project site, the contamination reduction zone and uncontaminated zone may be the same location but must first be determined based on the site monitoring program.

No staff shall be allowed in an area that is designated as a contamination zone, or a contamination reduction zone (that is not also an uncontaminated zone), unless authorized by the SSS or acting SSP Project Manager. Workers entering areas other than uncontaminated zones must comply with the PPE provisions of this plan, and satisfy all the requirements as specified in 29 CFR 1910.120. The SSS or SSO will cease activities if the site control portions of this SSP are not properly followed.

18.0 Decontamination Procedures

18.1 Decontamination Areas

The decontamination areas of the project site will be established prior to the commencement of any operations in the contamination reduction zone(s) or uncontaminated zone(s). Decontamination areas may be reestablished by the SSS or SSO in response to changes that occur in environmental conditions or as site activities warrant.

18.2 Equipment Decontamination

Equipment will be appropriately decontaminated between each sampling location and before it is transported away from the project site. Non-disposable PPE will also be appropriately decontaminated before it is removed from the site. Water generated from decontamination of equipment will be temporarily stored in containers and, subsequent to sample collection and analyses, properly disposed.

Decontamination of personnel will be accomplished by removing any contaminated clothing and gear, washing all exposed skin with a solution of deionized water and Liquinox®, and rinsing with deionized water. Rinse water will be temporarily stored in containers and disposed of properly.

18.3 Emergency Decontamination

The decision whether or not to decontaminate a worker is based on the contaminant type and severity of the resulting injury or illness. For some emergency victims, immediate decontamination may be an essential part of life saving first aid. For others, decontamination may aggravate the injury or delay life-saving treatment. If decontamination does not interfere with essential treatment, it shall be performed.

- **If decontamination can be performed:**

  All protective clothing and equipment will be removed, cut off, or rinsed.

- **If decontamination cannot be performed:**
  The worker will be wrapped in blankets, plastic, or rubber in order to reduce the potential of contaminating other site personnel. The appropriate emergency medical personnel will be alerted to any potential contamination that is present and will be instructed about specific decontamination procedures, if necessary. Site personnel with specific knowledge of the incident will be sent along with emergency medical staff to an appropriate care facility.

  If immediate medical treatment is required to save a life, decontamination procedures should be delayed until the worker is stabilized. If decontamination can be performed without interfering with essential life-saving techniques or first aid, or if a worker has been contaminated with an extremely toxic or corrosive material that could cause severe injury or loss of life, decontamination must be performed immediately.

  If an emergency attributable to a heat-related illness develops, protective clothing should be removed from the worker as soon as possible, in order to reduce heat stress.

19.0 General Safety Requirements

The following general safety procedures shall be followed by persons entering and/or working in the immediate area of project activities:

1. No employee or subcontractor personnel will be allowed on site without the prior knowledge and consent of the SSS.
2. There will be no field activities conducted without sufficient backup personnel. At a minimum, two persons who currently satisfy the health and safety requirements as specified in 29 CFR 1910.120 (e) must be present at the site while field activities are in progress.
3. Personnel involved with the project shall bring to the attention of the SSS or SSO any unsafe condition or practice associated with site activities.

4. Site personnel must avoid unnecessary contamination, such as walking through known or suspected "hot" zones or contaminated puddles, kneeling or sitting on the ground, and/or leaning against potentially contaminated equipment.
5. Respiratory devices may not be worn by staff with beards or under any other conditions that may prevent a proper seal or fit.
6. Respiratory devices may not be worn with contact lenses.
7. No entry of any excavation or test pit that is greater than 5 feet in depth will be allowed without the proper installation of trench shoring, or other approved means of excavation security designed and installed in conformance with current Cal/OSHA and OSHA regulations.
8. Smoking will only be allowed in designated areas of the project site.
9. Hard hats will be worn within 10 feet of any heavy equipment that is operating.
10. Proper hearing protection will be worn at the project site, in conformance with current Cal/OSHA and OSHA regulations.
11. Proper eye protection will be worn at the project site, in order to protect the eyes from liquid splashes, flying debris, or other potential hazards.

20.0 Emergency Response Plan

The SSS or SSO shall be immediately notified of any injury or accident that occurs at the project site. Listed in Section 19.1 are emergency telephone numbers and the locations of nearby medical care facilities in the event that a job site injury requires off-site medical aid. Written directions to Mad River Community Hospital are provided in Table 1. Figure 1 shows the location of the hospital.

Table 1. Driving Directions to Mad River Community Mad River Community Hospital Royal Gold, LLC, 1689 Glendale Drive, Glendale, California

Directions	Distance (mi.)
Head south of Glendale Dr	0.1
Turn right to merge onto CA-299 W toward Arcata	0.2
Merge onto CA-299 W	2.9
Keep left to stay on CA-299 W	0.8
Take the exit onto US-101 N toward Crescent City	0.4
Take exit 716B for Giuntoli Ln toward Janes Rd	0.3
At the traffic circle, take the 3rd exit onto Giuntoli Ln	0.2
At the traffic circle, take the 1st exit and stay on Giuntoli Ln	0.1
Continue onto Janes Rd	0.4
Turn left into Mad River Community Hospital	--

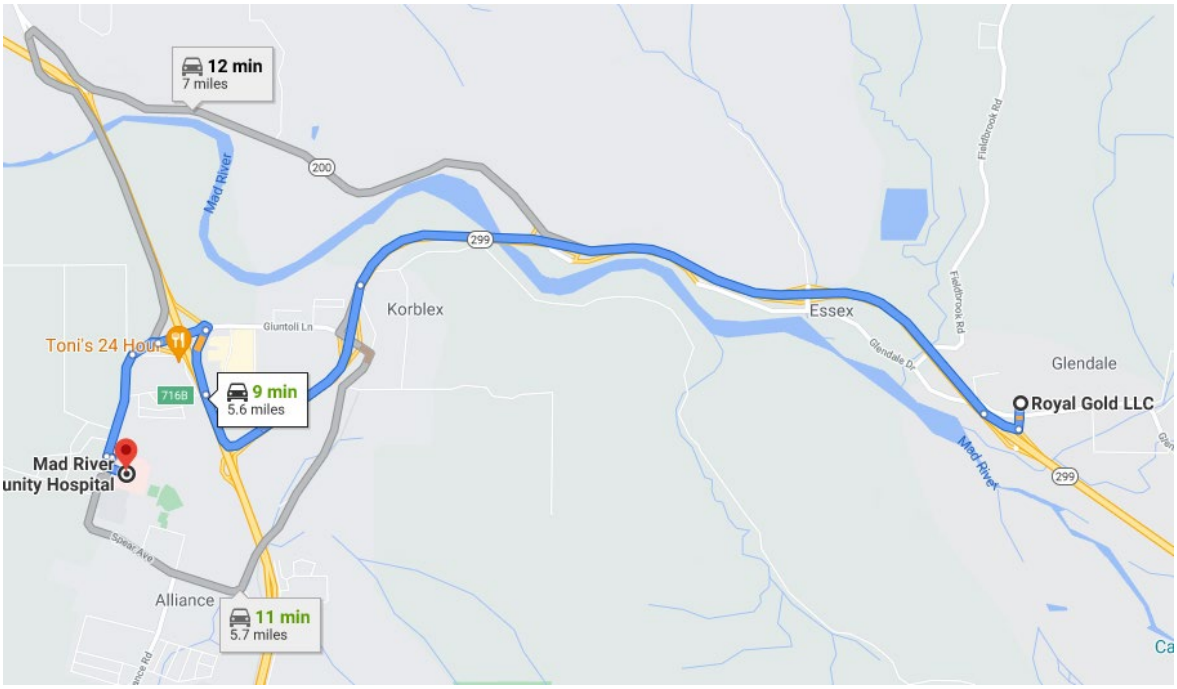


Figure 1: Map of Driving Directions to Mad River Community Hospital.

20.1 Emergency Contacts

In the event of an emergency, the following agencies and persons shall be appropriately notified immediately following the necessary emergency response contacts:

Medical Facility	Phone Number
Emergency Medical Facilities:	
Mad River Community Hospital: 3800 Janes Rd, Arcata, CA	911 or (707) 822-3621
Ambulance	911
Fire Department	911
Police Dept	911
Poison Control Hotline	800-523-2222

20.2 Government Contacts

In the event of an unauthorized release of potentially hazardous materials, the following agencies shall be notified:

Contact	Phone Number
North Coast Regional Water Quality Control Board	707-576-2220
State Office of Emergency Services	800-852-7550
Humboldt County Division of Environmental Health	707-445-6215
Department of Toxic Substances Control	916-255-3545

21.0 Implementation Schedule

Before fieldwork begins, the following activities must be completed:

- Site personnel must read and acknowledge this SSP by signing the "Daily Record, Site Safety Meeting Attendance" form presented in Appendix 1.
    - The SSS is responsible for ensuring that all site personnel, including subcontractors, read and acknowledge this SSP.
- Under the supervision of a licensed physician, workers must be medically qualified to work at the site.
- Hand washing facilities must be in place at the work site and ready to use prior to fieldwork.
- The SSO will ensure that housekeeping practices and debris waste handling instructions are followed.
- The SSO will ensure that dust suppression techniques are used when handling earthen materials and during construction operations.

22.0 Onsite Documentation

Compliance with this SSP will be documented by execution of the "Daily Record, Site Safety Meeting Attendance" form presented in Appendix 1. By signing these sheets, each person to be involved in the project field activities acknowledges willingness to comply with this SSP throughout the period of the current field activities. Safety meetings will be scheduled at the beginning of field operations, and will be held at the start of each day. Field monitoring results will be recorded and stored at Royal Gold. Cal/OSHA regulation, 8 CCR § 1532.1 requires the employer to communicate information concerning hazards to employees according to the Hazard Communication Standard, 8 CCR § 5194. Documentation of employee medical surveillance, training, and respirator fit test records is maintained at the corporate office of each company involved in the project. Subcontractors are responsible for maintaining their own safety training records.

23.0 Hazardous Site Operations Employee Training

All personnel who work at hazardous materials sites must have received the mandated OSHA 40-hour Hazardous Site Operations Training and subsequent annual 8-hour recertification, as specified in CFR Title 29 §1910.120.

24.0 Medical Surveillance

All employees are required to have a complete physical examination prior to their assignment at a hazardous materials project site. Comprehensive physical examinations provide not only baseline health and monitoring information, but also include a level of assurance that the employee is capable of wearing the required protective equipment and performing potentially strenuous work.

25.0 References Cited

California Department of Toxic Substances Control. (1998). Site certification issued. NR:DTSC.

California Division of Occupational Health and Safety. (NR). "5194 Title 8, CCR Hazard Communication." Sacramento, CA:Cal/OSHA.

SHN. (August 2021). "Soil and Groundwater Management Plan, Royal Gold, LLC at 1689 Glendale Drive, Glendale, California." Eureka, CA:SHN.

Site Safety Forms

1

Time of Day	Site Location/Activity	Total Dust Concentration[1]

1. Total Dust Concentration:
   Quantitative Method: mg/m^3 – measured in milligrams per cubic meter with a real-time instrument
   Qualitative Method: visible emissions observed (presence/absence)

Key Personnel and Responsibilities

Activity_____
_____
_____

Date_____

Title	Name	Office Telephone Number	Mobile Phone Number
Site Safety Supervisor (SSS):			
Site Safety Officer (SSO):			
Project Manager			

SSS: A California professional geologist or engineer with experience in hazardous waste operations that has OSHA 40-hour training and 8 hour OSHA supervisor training

SSO: A staff person experienced in hazardous waste operations with 40-hour OSHA Training

Hazardous Materials Site Operations
Site Safety Meeting Attendance
Royal Gold, LLC
Glendale, California

Job Name: Activity: Job #:

Given By: Signature: Date: Time:

Company/Agency	Name	Operation/ Function	Signature	Read SSP	29CFR1910.120(e)	
					40 hr	24 hr
				Y / N	Y / N	Y / N
				Y / N	Y / N	Y / N
				Y / N	Y / N	Y / N
				Y / N	Y / N	Y / N
				Y / N	Y / N	Y / N
				Y / N	Y / N	Y / N
				Y / N	Y / N	Y / N
				Y / N	Y / N	Y / N
				Y / N	Y / N	Y / N

Job Hazard Analysis

Action Level Monitoring Results
Total Organic Vapor
Royal Gold, LLC
Glendale, California

Job Name: Activity: Job #:

Sampled By: Signature: Date: Time:

Time	Instrument	Sample Reading	Upgrade To?	Comments

Job Hazard Analysis

Activity:	**Date:**
	Project:
Description of the work:	**Site Supervisor:**
	Site Safety Officer:
	Review for latest use: Before the job is performed.

Work Activity Sequence (Identify the principal steps involved and the sequence of work activities)	**Potential Health and Safety Hazards** (Analyze each principal step for potential hazards)	**Hazard Controls** (Develop specific controls for each potential hazard)
	1.	1.
	2.	2.
	3.	3.
	4.	4.
	5.	5.

Job Hazard Analysis

Work Activity Sequence (Identify the principal steps involved and the sequence of work activities)	**Potential Health and Safety Hazards** (Analyze each principal step for potential hazards)	**Hazard Controls** (Develop specific controls for each potential hazard)
	1.	1.
	2.	2.
	3.	3.
	4.	4.
	5.	5.
	6.	6.
	7.	7.
	8.	8.

Job Hazard Analysis

Equipment to be used (List equipment to be used in the work activity)	**Inspection Requirements** (List inspection requirements for the work activity)	**Training Requirements** (List training requirements including hazard communication)

Job Hazard Analysis

	PRINT NAME	SIGNATURE	
Supervisor Name:	_____	_____	Date/Time:_____
Safety Officer Name:	_____	_____	Date/Time:_____
Employee Name(s):	_____	_____	Date/Time:_____
	_____	_____	Date/Time:_____
	_____	_____	Date/Time:_____
	_____	_____	Date/Time:_____
	_____	_____	Date/Time:_____
	_____	_____	Date/Time:_____
	_____	_____	Date/Time:_____

Suspended Particle Matter Monitoring

2

Suspended Particle Matter Monitoring
Royal Gold
Glendale, California

Project Number:

Work Area/Activities:

Date: **Monitored By:**

Instructions: If using qualitative method, observe project for dust emissions and note presence/absence. If using quantitative method, use aerosol monitor in accordance with manufacturer's instructions. Ensure that background samples are collected when debris pile disturbances are not taking place.

Project Action Levels	Quantitative: 5 mg/m^3 or Qualitative: visible airborne dust emissions

Time of Day	Site Location/Activity	Total Dust Concentration[1]

Eureka, CA | Arcata, CA | Redding, CA | Willits, CA | Fort Bragg, CA | Coos Bay, OR | Klamath Falls, OR

Stormwater Pollution Prevention Plan

5.9

Stormwater Pollution Prevention Plan

Royal Gold Premium Potting Soils
Arcata, California
WDID: 1 12I025790

Prepared for:

Royal Gold LLC

June 2021

016098.002

Phone: (707) 441-8855 **Email:** info@shn-engr.com
Web: shn-engr.com • 812 W. Wabash Avenue, Eureka, CA 95501-2138

Stormwater Pollution Prevention Plan

Royal Gold Premium Potting Soils
Arcata, California
Waste Discharge Identification: 1 2I025790

Prepared for:

Royal Gold LLC

Exceedance Response Action (ERA) Status:
Level 2

Legally Responsible Person (LRP):
Chad Waters
Royal Gold LLC
1689 Glendale Drive, Arcata, California 95521
(707) 822-4653

Duly Authorized Representative:
Eric Free
(707) 822-4653

Prepared by:

812 W. Wabash Ave.
Eureka, CA 95501-2138
(707) 441-8855

June 2021

QA/QC: GJE GJE
Reference: 016098.002

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Legally Responsible Person

Approval and Certification of the Stormwater Pollution Prevention Plan

Facility Name:	Royal Gold Premium Potting Soils
Waste Discharge Identification (WDID):	1 12I025790

I certify under penalty of law that this document and attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Chad Waters	**(707) 822-4653**
Legally Responsible Person	Telephone Number
Signature of Legally Responsible Person or Approved Signatory	Date
	(707) 822-4653
Signature of Duly Authorized Representative, Eric Free	Telephone Number

Amendment Log

Facility Name: Royal Gold Premium Potting Soils
Waste Discharge Identification (WDID): 1 12I025790

Amendment No.	Date	Page and Section No.	Requested By	Brief Description of Amendment; include reason for change, site location, and BMP modifications.	Prepared and Approved By
1	09/2016	Appendix H	LRP	Pollutant Source Amendment	QISPs
2	12/2016	Complete revision	LRP	Complete revision of SWPPP and Facility map	QISPs/ LRP
3	12/2016	Appendix I	LRP	Level 1 ERA Report & Evaluation Memo	QISPs/ LRP
4	9/15/2017	Pg. 9, Sec. 2.1.3.2; Pg. 13, Sec. 2.1.4, Pg. 18, Table 2.2; Pg. 27, Table 3.2; Pg. 36, Table 5.1	LRP	Update to facility description including DMAs, and Site Map, Update tables, Added Appendix J: consent decree	QISPs/ LRP
5	5/12/2021	Updates throughout	LRP	Integrated relevant language of previous amendments into SWPPP text; removed Appendices H, I and J; update to facility description including DMAs, and Site Maps, update tables	QISPs/LRP

Section 1 SWPPP Requirements

1.1 Introduction

This document incorporates historical amendments of the original stormwater pollution prevention plan (SWPPP) which was uploaded to the State Water Board's Stormwater Multiple Application and Report Tracking System (SMARTS) website on August 12, 2015. This SWPPP is a revision to the original SWPPP and is designed to comply with California's General Permit for Stormwater Discharges Associated with Industrial Activities (General Permit or IGP) Order No. 2014-0057-DWQ (NPDES No. CAS000001), issued by the State Water Resources Control Board (State Water Board). This SWPPP has been prepared following the SWPPP template provided on the California Stormwater Quality Association Stormwater "Best Management Practice Handbook: Industrial and Commercial" (CASQA, 2014). In accordance with the General Permit, Section X.A, this SWPPP contains the following required elements:

- Facility Name and Contact Information
- Site Map
- List of Significant Industrial Materials
- Description of Potential Pollution Sources
- Assessment of Potential Pollutant Sources
- Minimum Best Management Practices (BMPs)
- Advanced BMPs, if applicable
- Monitoring Implementation Plan (MIP)
- Annual Comprehensive Facility Compliance Evaluation (ACFCE)
- Date that SWPPP was initially prepared, and the date of each SWPPP Amendment, if applicable

1.2 Permit Registration Documents

Permit registration documents (PRDs) were submitted to the State Water Board using the Stormwater Multi Application and Report Tracking System (SMARTS), by the Legally Responsible Person (LRP), or authorized personnel (i.e., Approved Signatory) under the direction of the LRP. The project-specific PRDs include:

- Notice of Intent (NOI)
- Signed Certification Statement (LRP Certification is provided electronically with SMARTS PRD submittal)
- Site Maps
- SWPPP
- Annual Fee

The "Site Location Map" and BMP "Site Map" can be found in Appendix A. A copy of the submitted PRDs is included in Appendix B, along with the Waste Discharge Identification (WDID) confirmation.

The SWPPP uploaded into SMARTS does not include a copy of the General Permit.

In the event of future significant changes to the facility layout, the Discharger will certify and submit new PRDs using SMARTS.

1.3 SWPPP Availability

The SWPPP is available onsite to employees during hours of operation and will be made available upon request by a state or municipal inspector.

1.4 Pollution Prevention Team

Facility staff members that have been designated as Pollution Prevention Team members are listed below in Table 1.1, along with their responsibilities and duties. This table will be updated as needed when there are changes to staff and staff responsibilities. Team members will be trained to perform the duties assigned to them. Employee training logs are provided in Appendix C.

Table 1.1 Pollution Prevention Team

Name	Title	24-hour Phone Number	Responsibilities and Duties
Chad Waters	Owner	(707) 822-4653	Legally Responsible Person
Eric Free	Office Manager	(707) 822-4653	Duly Authorized Representative, SWPPP implementation, certification of reporting
Clinton Betts	Environmental Compliance Officer	(707) 822-4653	SWPPP/BMP Coordination & Implementation, recordkeeping, stormwater sampling & Qualified Industrial Stormwater Practitioner (QISP)
Dan Love	Grounds Crew	(707) 822-4653	SWPPP implementation & stormwater sampling
Dustin Tharaldson	Grounds Crew	(707) 822-4653	SWPPP implementation & stormwater sampling
Alma Rodriguez	Ground Crew Implementation	(707) 822-4653	SWPPP implementation & stormwater sampling
SHN: Gwen Erickson	Compliance Group Leader	(707) 441-8855	Annual inspection, training, ERA Reports, SWPPP and data review, SMARTS management as needed

Qualified Industrial SWPPP Practitioners (QISPs) are identified, as needed, in Table 1.1. Following status level change from "Baseline," the QISP will have primary responsibility for providing training to the appropriate team members assigned to perform the activities required in this SWPPP.

1.5 Duly Authorized Representatives

Duly authorized representatives who are responsible for SWPPP implementation and have authority to sign PRDs are listed below in Table 1.2.

Table 1.2 Duly Authorized Representatives

Name	Title	Phone Number
Eric Free	Office Manager	(707) 822-4653

1.6 Permits and Governing Documents

In addition to the General Permit, the following agency requirements and documents have been taken into account while preparing this SWPPP:

- North Coast Unified Air Quality Management District (NCUAQMD)–Source Permits
- California Environmental Reporting System (CERS) – Hazardous Material Business Plan
- Humboldt County Division of Environmental Health (DEH)–Odor Impact Minimization Plan (OIMP)
- Humboldt County Planning Department–Draft Conditional Use Permit including analysis of environmental impacts under the California Environmental Quality Act (CEQA)
- California Department of Fish & Wildlife (CDFW)–Streambed Alteration Agreement
- Fieldbrook Glendale Community Services District (FGCSD) Significant Industrial User (SIU) wastewater discharge permit.

The Royal Gold Company has also consulted with or made modifications to this former lumber mill site to comply with the regulations of several other agencies including the following:

- California Department of Toxic Substances Control (DTSC)–Consultation with Nina Bacey, Henry Wong, and Nicole Yuen of DTSC to conduct and improve their business on the former McNamara and Peepe Lumber Mill site.
- Blue Lake Fire Department–Coordination with Blue Lake Fire Department to design the Royal Gold facility to provide adequate emergency access and renovate the fire suppression system at the site to comply with current fire code requirements.

1.7 SWPPP Amendments

This SWPPP will be amended or revised as needed. A list of amendments (Amendment Log) is included in the front of this SWPPP, and amendment certifications are included in Appendix D. The Amendment Log will include the date of initial preparation and the date of each amendment.

The SWPPP should be revised when:

- There is a General Permit violation.
- There is a reduction or increase in the total industrial area exposed to stormwater.
- BMPs do not meet the objectives of reducing or eliminating pollutants in stormwater discharges.
- There is a change in industrial operations that may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4).
- There is a change to the parties responsible for implementing the SWPPP.
- Otherwise deemed necessary by the QISP.

The following items will be included in each amendment:

- Identification of the party who requested the amendment
- The location of proposed change
- The reason for change

- The original BMP(s) proposed, if any
- The new BMP(s) proposed

Amendments will be logged at the front of the SWPPP, and certification will be kept in Appendix D. The SWPPP text will be revised replaced, and/or hand annotated as necessary to convey the amendment properly. SWPPP amendments must be certified and submitted by the LRP or their designated Duly Authorized Representative using SMARTS within 30 days whenever the SWPPP contains significant revisions. With the exception of significant revisions, SWPPP changes will be certified and uploaded to SMARTS once every three (3) months in the reporting year.

1.8 Retention of Records

Paper or electronic records of documents required by this SWPPP will be retained for a minimum of five (5) years from the date generated or date submitted, whichever is later, for the following items:

- Employee Training Records
- BMP Implementation Records
- Spill and Clean-up Related Records
- Records of Sampling and Analysis Information
    - The date, exact location, and time of sampling or measurement
    - The date(s) analyses were performed
    - The name(s) of the individual(s) that performed the analyses
    - The analytical techniques or methods used
    - The results of such analyses
- Records of visual observations
    - The date of visual observations
    - The industrial areas/drainage areas of the facility observed during the inspection (Location)
    - The approximate time of the observation
    - Presence and probable source of observed pollutants
    - The name(s) of the individual(s) that conducted the observations
- Response to the observations including identification of SWPPP revisions if needed
- Level 1 Exceedence Response Action (ERA) Reports
- Level 2 ERA Action Plan
- Level 2 ERA Technical Report
- Annual reports from SMARTS (checklist and any explanations)

Copies of these records will be available for review by the Water Board's staff at the facility during scheduled facility operating hours. Upon written request by the United States Environmental Protection Agency (EPA) or the local MS4, Dischargers will provide paper or electronic copies of requested records to the Water Boards, EPA, or local MS4 within ten (10) working days from receipt of the request.

1.9 Exceedance Response Actions

If a General Permit NAL exceedance occurs in a given reporting year, a Level 1 ERA evaluation and a Level 1 ERA report will be required in the following year, or, if in a subsequent year, a Level 2 ERA action plan and a Level 2 ERA report will be required in accordance with the General Permit. The results of either of the ERA reports may require that the SWPPP be amended.

1.10 Annual Comprehensive Facility Compliance Evaluation

The General Permit (Section XV) requires the Discharger to conduct one Annual Comprehensive Facility Compliance Evaluation (Annual Evaluation) for each reporting year (July 1 to June 30). Annual evaluations will be conducted at least eight (8) months and not more than sixteen (16) months after the previous annual evaluation. The planned window for conducting the annual evaluation is between April and June of each year.

The SWPPP will be revised, as appropriate based on the results of the annual evaluation, and the revisions will be implemented within 90 days of the annual evaluation.

At a minimum, annual evaluations will consist of:

- A review of sampling, visual observation, and inspection and monitoring records and sampling and analysis results conducted during the previous reporting year.
- A visual inspection of areas of industrial activity and associated potential pollutant sources for evidence of, or the potential for, pollutants entering the stormwater conveyance system.
- A visual inspection of drainage areas previously identified as having no exposure to industrial activities and materials in accordance with the definitions in Section XVII.
- A visual inspection of equipment needed to implement the BMPs.
- A visual inspection of BMPs.
- A review and effectiveness assessment of BMPs for each area of industrial activity and associated potential pollutant sources to determine if the BMPs are properly designed, implemented, and are effective in reducing and preventing pollutants in industrial stormwater discharges and authorized Non-Stormwater Discharges (NSWDs).
- An assessment of any other factors needed to comply with the annual reporting requirements in General Permit Section XVI.B.

1.11 Annual Report

The annual report will be prepared, certified, and electronically submitted no later than July 15 following each reporting year using the standardized format and checklists in SMARTS based on the reporting requirements identified in Section XVI of the General Permit. Annual reports will be submitted in SMARTS and in accordance with information required by the online forms.

1.12 Termination and Changes to General Permit Coverage

When any of the following conditions occurs, termination of coverage under the General Permit will be requested by certifying and submitting a notice of termination (NOT) using SMARTS:

- Operation of the facility has been transferred to another entity.
- The facility has ceased operations, completed closure activities, and removed industrial related pollutant generating sources.
- The facility's operations have changed and are no longer subject to the General Permit.
- The SWPPP and provisions of the General Permit will be complied with until a valid NOT is received and accepted by the Board.

- If ownership changes, the new owner of the facility will be notified of the General Permit and regulatory requirements for permit coverage.

1.13 Compliance Group

This facility is a participant of a stormwater compliance group established in accordance with Section XIV of the General Permit. The compliance group consists of dischargers that operate facilities with similar types of industrial activities, pollutant sources, pollutant characteristics, and standard industrial classification (SIC) codes.

The compliance group has a designated group leader who has completed an SWRCB-approved training program and who is certified as a QISP Trainer of Record (ToR), as is required for compliance group leaders. The compliance group leader assists facility personnel with compliance activities required by the General Permit, prepares and revises ERA reports (if needed), and conducts at least one facility inspection per year. The compliance group leader is Gwen Erickson IGP ToR/QISP #00141.

Section 2 Facility Information

2.1 Facility Description

The Royal Gold soil operations falls under the designation of Standard Industrial Classification (SIC) code 2875, Fertilizers, mixing only. This includes mixed potting soil, which is the primary activity at this facility. Royal Gold is a coco fiber and potting soil manufacturer operating since 2009.

Prior to Royal Gold, a lumber mill operated at the site since the 1950s. From 1967 to 1984, the use of a chemical fungicide containing pentachlorophenol (PCP) and tetrachlorophenol (TCP) occurred at the site to treat lumber. In 1998, soils in the south-central portion of the facility (DMA-5) were consolidated and capped with concrete to prevent PCP and TCP detected in soil from being discharged to groundwater and surface water. This area of the facility is monitored by the DTSC.

This SWPPP describes operational conditions associated with the Royal Gold facility as they pertain to stormwater management. A site map (Appendix A) and the BMPs employed onsite, are included in this SWPPP to describe the water quality protection measures taken to comply with the state Industrial General Permit. The overall goal of this SWPPP is to reduce the impacts from industrial activities on the site to stormwater.

2.1.1 Facility Location

Royal Gold is located at 1689 Glendale Drive in the unincorporated community of Glendale, approximately 1.5 miles northwest of the City of Blue Lake, California in Humboldt County. The facility's coordinates are 40.900839° latitude and -124.022139° longitude.

The facility includes the following Assessor parcel numbers: 516-101-005, -008, - 017, -040, -041, -060, -063, -064, -079, -081, -083, and -084, and 516-111-062 and -063. The collection of parcels comprises approximately 46 acres (Appendix A).

The topographic location is the SW ¼, Section 13, T6N, R1E, H.B. & M., Arcata North 7.5 min United States Geological Survey (USGS) quad sheet. The facility slopes downward to the south and elevations range from approximately 120 feet above sea level in the north to 99 feet above sea level in the south. The Mad River is approximately 850 feet south of the facility.

2.1.2 Facility Operational Areas

Industrial operations at the site include the production and distribution of coco pith-based potting soil. The raw materials used to make the soil material are imported to the site, then processed and packaged on site. The soil products are primarily packaged in 2 cubic feet (ft^3) and 3 ft^3 bags as well as 1 cubic yard (yd^3) and 2 yd^3 totes. Bulk deliveries are available upon request.

The operation primarily involves unloading and processing raw materials, mixing raw and processed materials, packaging, and loading the soil material on trucks for distribution. Typical equipment used for the processing and loading activities includes a grinder, trommel screener, front-end loaders, forklifts, mixing line, bagging lines, street sweepers, water trucks, and hauling trucks.

Industrial operational areas are comprised of:

- Facility Entrance and access roads
- Maintenance shop and fueling area
- Coco processing area
- Sawdust Storage area
- Forest humus processing area
- Soil bagging lines
- Amendment mixing and bagging line
- Truck loading/unloading
- Raw/finished product storage

Below is a description of industrial materials used and activities that occur at the Royal Gold facility:

Coconut Fiber Processing: Coconut fiber is made from dried and ground coconut husks. It is delivered as compressed bricks that are stacked and wrapped on a pallet. The compressed bricks of fiber are rehydrated and processed for use in the soil mixes.

Forest Humus Processing: Sawdust is received from several local sources and is stored in several large piles. Sawdust piles are covered as feasible, until ready to use. The piles are screened prior to use in soil production. Larger material that is screened out and not reprocessed on site is donated to various outlets.

Peat Processing: Peat is delivered in compressed bales and processed through an industrial bale buster where the material is expanded to be ready for use in soil production.

Coco Chip Processing: Coco chips are cut but not ground coconut husk fibers that are dried, compressed, and delivered on pallets wrapped in plastic. Coco chips are rehydrated prior to processing and use in soil production.

Compost Handling Procedure: OMRI[1] certified organic compost is delivered to the site and stored in an existing metal building on parcels 516-101-060 and 516-111-063. Compost piles are turned once a week or as necessary to maintain quality. This product comes fully processed and is ready to use in soil production.

Amendments: Amendments are delivered in either pallets of bagged material or bulk totes and stored under cover until ready for use in soil production.

Bagging Line Mixing Detailed Description: Bagged soil is mixed in automated mixing lines and bagged in either automated or manual bagging lines. The mixing lines include a series of computer-controlled hoppers that blend the raw materials. Ingredients are placed into hoppers by front end loader or by hand, within covered structures and on paved surfaces. Amendments are applied by the hoppers to the mixing line in a fully enclosed dust hut where they are incorporated into the soil mixing process. The automated line feeds and mixes the ingredients to product specifications. A bagging hopper then feeds soil through a bag chute, where the bags are filled, sealed, flattened, and palletized.

[1] Organic Materials Research Institute, OMRI®

Product Storage: The pallets of bagged soil are covered with a topper, wrapped in shrink wrap, and stored under cover until they are ready for shipment. Palletized product is loaded onto flatbed or enclosed semi-trucks for distribution.

Bulk Mixing Detailed Description: For the production of bulk soil products (bulk totes and loose bulk), ingredients are piled together on a paved surface and blended gently with a front-end loader in the bulk soil yard in the central portion of the facility. After being mixed, bulk soil for totes is loaded into the bulk tote hopper, where it is fed by conveyor to a chute used to fill the totes. Finished totes are stacked on pallets and banded to ensure they do not shift or fall over during shipping via flatbed or container semi-trucks. Bulk soil that is sold "loose" is stored in piles and covered with tarps until it is ready to be shipped out in a covered dump truck.

Fertilizer Production: For the production of Royal Gold's fertilizer line, ingredients are processed, measured, mixed, and fed into an auger system that leads to the bagging line. Bags are filled, sealed, and placed into boxes which are then stacked, palletized, and covered for storage before shipping out for distribution. Fertilizer mixing and bagging is done in a fully enclosed building.

2.1.3 Description of Drainages

2.1.3.1 Regional Drainages

According to the California ArcGIS "Industrial Storm Water Map," the facility is located within the Lower Mad River Watershed (HUC 1801010204 ID).

Stormwater discharges from the west side of the facility (discharge location 1 & 2) flow into roadside ditches that drains to a vegetated buffer.

Stormwater discharges from the central and eastern portions of the site (discharge locations 3–9) flow to the south through a series of stormwater conveyance ditches and culverts on adjacent properties, which eventually discharge into Hall Creek, and ultimately, to the Mad River.

Discharge from the northwestern corner of the facility (discharge location 10) flows to the north through a bioswale into a vegetated buffer.

2.1.3.2 Description of Existing Site Drainages, Associated Industrial Activities, and BMPs

The Royal Gold facility slopes down to the south toward Mad River. Approximately 67 percent of the facility is impervious surfaces including roof tops, shelters, roadways, and concrete paved areas. Historical drainage features onsite have been modified and augmented over the past 10 years to accommodate facility operations and BMP implementation for improved site drainage and water quality.

The site is currently divided into 11 separate drainage management areas, 9 of which produce flow and have sampling locations (Appendix A, Figure 2). The following includes details of the facility's drainage management areas including approximate area calculations, industrial activity, BMPs, and their corresponding discharge/sampling locations. The site maps in Appendix A show site features (by number) including approximate surface flows, storm drainage system, drainage inlets, drainage areas, and discharge locations.

DMA-1 (1.4 acres) DMA-1 is located in the southwestern portion of the facility and is nearly entirely impervious. This DMA includes the northern building and outside operations immediately west of that building. Industrial operations in the northern building include the upper two bagging lines and finished coco storage. This DMA also includes the business office and a paved access road coming from Glendale Drive. Stormwater runoff from the building in this DMA has been routed through downspout filters.

The bagging line mixing operations are described in Section 2.1.2 Facility Operational Areas. A 60 percent woven shade cloth screen has been installed along the southern perimeter of the building housing the office and upper bagging lines to minimize dust particulates from leaving the area. The amendments on the bagging line are fed into hoppers, which transfer the material into an enclosed Dust Hut (storm resistant shelters) where the product is mixed.

A geotextile fabric-lined vegetated ditch that runs along the northern side of the access road parallel to the northern building conveys stormwater from this DMA to Discharge Location 1. The ditch was constructed and is maintained as a BMP to mitigate potential pollutants in stormwater from this area. The lined vegetated ditch is outfitted with gravel bag check dams and several Filtrexx Soxx; it also contains a sediment detention pond with a floating treatment island to further treat stormwater as it flows through the pond.

DMA-2 (1.7 acres) DMA-2 is located in the southwestern portion of the facility south of DMA-1 and is mostly impervious. This DMA consists of the southern building, including coco production, coco hydration water collection system and automated bagging line; the maintenance shop; and paved access road. Processed water from the coco hydration is routed into a stainless-steel tank, through a sediment filter, and into a series of tanks where the water is stored until it can be metered into the local sanitary sewer. This system is covered and separate from the stormwater system.

A 60 percent woven shade cloth screen has been set up on the southern perimeter of the bagging line in order to minimize the transportation of dust particulates. Additionally, the eastern portion of the building has been enclosed to protect the automated bagging line and cut down on noise and dust particles. Similar to the DMA-1 bagging line, this DMA bagging line's material is mixed within an enclosed Dust Hut. Stormwater runoff from the buildings in this DMA has been routed through downspout filters. A spill kit is located inside the maintenance shop and the appropriate employees have been trained to properly use its contents during a spill event.

The stormwater discharge from DMA-2 flows from a stormwater conveyance ditch located on the south side of the building into a subsurface conveyance system offsite. The ditch has a polypropylene liner, Filtrexx Soxx and non-woven gravel bag berms. These berms help to slow the velocity of the stormwater and allow for particulates to settle out. The polypropylene liner allows for erosion control and easy maintenance of the settling areas.

DMA-3 (3.0 acres) DMA-3 is located to the east of DMA-1 and DMA-2 and includes the main entrance area; fueling area; truck, vehicle, and equipment storage; waste disposal area; raw/finished product storage (palletized, sealed, and covered); employee parking; coco process water tanks and pond; and concrete sediment trap. Stormwater runoff from buildings in this DMA has been routed through downspout filters. Spill kits are available at the fuel station and on each piece of equipment; operators and the BMP crew have been trained to use the contents during a spill event.

The discharge location for DMA-3 is located at the confluence outflow of a concrete sediment trap and a polypropylene lined sediment trap. Non-woven gravel bags form a berm at the outflow of the sediment trap. Stormwater then flows through a curb cut and into a ditch with commingled stormwater from the adjacent grocery store (Murphy's Market) parking lot. Stormwater samples are collected in the curb cut area prior to its confluence with the commingled ditch water.

DMA-4 (8.8 acres) DMA-4 is located north and northeast of DMA-3 and includes storage of raw/finished product (palletized, sealed, and covered), access roads, truck loading/unloading area, forest humus storage, raw sawdust storage, most of the bulk yard, and a series of stormwater ponds and sediment traps.

Numerous evergreen trees have been established in this area to help with wind erosion to provide protection of stockpiled materials and to act as bioretention features. Silt fences, block walls, fiber rolls, Filtrexx Soxx, gravel bag berms, stockpile covers (as feasible), and sediment traps have been installed as sediment control features.

This discharge location from this drainage area is where a series of stormwater ponds and drainage from the bulk yard flows into a 6-foot-wide concrete drainage ditch with wooden and rock check dams and Filtrexx wattles. The water from the ditch flows into a culvert and ultimately into a commingled stormwater conveyance ditch along the southern perimeter of the site. Water from the commingled ditch frequently backflows into the culvert that discharges stormwater from the facility.

DMA-5 (1.7 acres) DMA-5 is located in the southcentral portion of the facility and includes the southern portion of the bulk yard, bulk toting hopper, access roads, raw/finished product storage (palletized, sealed, and covered), peat processing building (peat barn) and the enclosed compost storage building. This area is entirely impervious. Fiber rolls, tree plantings, dust screens, and stockpile covers are used as sediment control features. The compost storage area is a storm-resistant structure with two permanent aluminum walls. The remaining sides of the structure are covered with a woven mesh screen. A concrete cap associated with historical mill operations surrounds the enclosed compost storage building.

The Discharge Location for DMA-5 is a polypropylene-lined swale, installed with gravel bag check dams and Filtrexx Soxx, that flows into a culvert to the commingled ditch along the southern boundary of the site.

DMA-6 (0.51 acres) DMA-6 is located in the southeastern corner of the facility and includes raw/finished product storage (palletized, sealed, and covered), truck loading area, access road and truck exit. The access road and loading area are paved but the storage area is permeable gravel. A Filtrexx Soxx has been installed around the discharge location, a drain inlet (DI). Sampling of this discharge location occurs as stormwater flows into the DI prior to flowing into the commingled conveyance system.

Two additional DIs are located within this DMA outside the gates, along Glendale Drive. It was determined that because runoff from Glendale Drive commingles with the minor amount of runoff from the site that reaches these DIs, that neither could be considered discharge locations for the facility.

DMA-7 (1.7 acres) DMA-7 is located north of DMA-6 and includes raw/finished product storage (palletized, sealed, and covered), loading area, and an access road. The pavement in this DMA is cracked and alligatored in may spots. Resurfacing of the paved areas is underway.

Stormwater from this DMA discharges by way of a DI located in the southeast corner of the area. Discharge Point 7 is no longer sampled due to the commingling of offsite runon before it enters the DI. A Filtrexx Soxx and an oil absorbent boom have been installed to treat runon flowing from the neighboring parcel. Structural runon controls are not possible on the Royal Gold facility without flooding a building on the neighboring property.

DMA-8 (1.2 acres) DMA-8 is located north of DMA-7 on the eastern boundary of the facility. This DMA includes a loading/unloading area, raw/finished product storage (palletized, sealed, and covered), and access roads. DMA 8 is nearly entirely paved so the main sediment control feature in this DMA is housekeeping and the treatment in the concrete drainage ditch described below.

On the eastern perimeter of the site in this DMA is a curb, fiber roll, eco-block system. This system has been installed to prevent surface water from flowing into a stormwater conveyance ditch that meanders back and forth over the Royal Gold facility's property line and neighboring properties. Stormwater is directed to a 2-foot-wide cement catch basin where the discharge location for this DMA is located. compost filter socks, a Filtrexx Soxx, and non-woven gravel bag berms have been installed in the catch basin.

DMA-9 (3.0 acres) DMA-9 is located on the eastern perimeter of the facility, north of DMA-8. This DMA includes raw/finished product storage (palletized, sealed, and covered), a rocked sediment control feature, access roads, and a truck loading area. Silt fences, tree plantings, and fiber rolls act as sediment and erosion control features in this DMA.

Stormwater from this area flows east into a bioswale on the eastern perimeter then south to a pond created from an old concrete wash station repurposed as a sediment detention pond. The pond is confined with eco blocks and gravel bag check dams with a floating treatment island placed in the pond. Stormwater leaves this pond and combines with the flow from DMA-8 before entering the culvert that flows under the southeast boundary of the property, combining with flows from DMA 3, 4, 5, 6, and 7 and flowing under Glendale Drive to a property across the street.

DMA-10 (0.75 acres) DMA-10 is located in the northwestern portion of the facility and is entirely paved. This area encompasses a portion of the raw sawdust storage pad as well as the recirculating rinse station. The rinse station is contained, and no water flows out of the rinse station area.

Stormwater from this small DMA generally flows to the north into a vegetated buffer area.

BMPs at this discharge location are comprised of fiber rolls that contain the sawdust on site and a sand biofilter that flows into a vegetated swale. The sampling location is at the terminus of the vegetated swale.

DMA-11 (2.5 acres) DMA-11 is located in the northern perimeter of the site and includes the northern access road and the waste soil pile. A vegetated berm has been installed to the north of the pile to aid in wind erosion control and to create a barrier to the flow of water from this area offsite.

Currently the water in DMA-11 infiltrates and does not have a location where it discharges from the property.

2.1.4 Stormwater Runon from Offsite Areas

The Royal Gold facility is impacted by stormwater runon from properties to the south and east. Emergent groundwater seeps on the hillside to the central west of the site also contribute to non-stormwater runon.

Stormwater runon from the south enters the facility near the main entrance. South of the facility is a bowling alley, grocery store (Murphy's Market), and a wood cutting yard. Stormwater sheet flows over the market parking lot into a stormwater conveyance ditch that runs along the southern boundary of Royal Gold's site. In addition, a series of residential units are situated along the boundary of this ditch, which also discharge into the conveyance system.

Stormwater runon from the east enters the facility at the property boundary near discharge location 7. Runon at this specific discharge location cannot be controlled because it leads to flooding at the neighboring parcel. A series of Filtrexx Soxx and oil absorbent booms have been added to the area to treat the runon from the neighboring parcel.

Runon from the west is primarily from seeps emerging from a forested slope above DMA-3 and DMA-4. Runon toward DMA-3 is minimal and captured by a vegetated swale at the base of the slope. This water is routed by way of the surface stormwater conveyance system to DMA-1. This runon does not come in direct contact with industrial operations but commingles with water in the lined and vegetated drainage in DMA-1. Runon into DMA-4 is also minimal and flows briefly along an internal access road and then crosses by way of a buried culvert into a vegetated area with a number of sediment basins.

2.2 Pollutant Source Assessment

2.2.1 Description of Potential Pollutant Sources

Table 2.1 includes a list of industrial activities and associated materials that are anticipated to be present in each operational area. These activities and associated materials could potentially contribute pollutants to stormwater runoff. The anticipated activities and associated pollutants provided in Table 2.1 are the basis for selecting the BMPs for the facility as described in Section 3.

Table 2.1 Summary of Potential Pollutant Sources and Corresponding BMPs[a]

Industrial Activity and Drainage Area	Pollutant Source	Pollutant	BMPs
Facility Entrance (DMA-3) and Access Roads (DMA-1-11)	• Trucks and vehicles • Leaks and spills • Windblown debris, recyclables, and particulates • Sediment tracking	• Lubricants • Gasoline and diesel • Hydraulic oil • Grease and motor oil • Soil, tire, and vehicle exhaust particulates • Increased total suspended solids from vehicle traffic on gravel surfaces	• Paved and gravel access roads for erosion prevention • Tracked materials swept • Water truck used as needed during dry periods • Spills/leaks contained and cleaned • Routine inspections of roads and housekeeping • Employee training • Fiber rolls and Filtrexx Soxx
Trucking/unloading (DMA-1, 2, 3, 4, 6, 7, 8, and 9)	• Trucks and vehicles • Leaks and spills • Windblown debris, recyclables, and particulates • Sediment tracking	• Lubricants • Gasoline and diesel • Hydraulic oil • Grease and motor oil • Soil, tire, and vehicle exhaust particulates • Increased total suspended solids from vehicle traffic on gravel surfaces • Plastics from pallet coverings ripped during moving of pallets	• Paved and gravel access roads for erosion prevention • Tracked materials swept • Water truck used as needed during dry periods • Spills/leaks contained and cleaned • Routine inspections of roads and housekeeping • Routine trash pickup • Routine inspection of equipment • Employee training • Fiber rolls and Filtrexx Soxx

Table 2.1 Summary of Potential Pollutant Sources and Corresponding BMPs[a]

Industrial Activity and Drainage Area	Pollutant Source	Pollutant	BMPs
Maintenance Shop and Fueling (DMA-1, 2, and 3)	• Trucks and vehicles • Waste Bins • Leaks and spills • Fuel • Maintenance activity	• Lubricants • Gasoline and diesel • Hydraulic oil • Grease and motor oil • Waste debris litter • Acetylene • Oxygen	• Storm-resistant enclosed building • Liquid materials under cover and contained • Spills/leaks contained and cleaned • Spill kits • Routine inspections and housekeeping • Employee training • Routine inspection housekeeping • Fiber rolls and Filtrexx Soxx
Bagging Lines (DMA-1 and DMA-2)	• Equipment • Product generation • Leaks and spills • Fuel	• Lubricants • Gasoline and diesel • Hydraulic oil • Grease and motor oil • Amendments • Dust particulates • Total Suspended Solids • Increased Chemical Oxygen Demand • Nitrates	• Storm-resistant building with 60% woven shade cloth • Partially enclosed building • Dust hut–where amendments are added to mixing process • Fiber rolls • Filtrexx Soxx • Vegetated Swales • Spills/leaks contained and cleaned • Spill Kit • Street sweeper • Employee training • Routine inspection housekeeping

Table 2.1 Summary of Potential Pollutant Sources and Corresponding BMPs[a]

Industrial Activity and Drainage Area	Pollutant Source	Pollutant	BMPs
Bulk Yard and Compost Building Area (DMA-4 and 5)	• Equipment • Product generation • Leaks and spills • Trucks and Vehicles • Product stockpiles	• Lubricants • Gasoline and diesel • Hydraulic oil • Grease and motor oil • Amendments • Dust particulates • Total Suspended Solids • Increased Chemical Oxygen Demand • Nitrates	• 60% woven shade cloth around compost building • Sediment traps • Stockpile covers, as feasible • Tree planting • Silt fences • Water truck and street sweeper • Fiber rolls & Filtrexx Soxx • Paved major access routes • Spills/leaks contained and cleaned • Spill kits • Employee training • Routine inspections and housekeeping
Coco Hydration (DMA-2)	• Equipment • Product generation • Leaks and spills • Trucks and Vehicles	• Lubricants • Hydraulic oil • Gasoline and diesel • Increased Chemical Oxygen Demand • Total Suspended Solids • Nitrates	• Activities are under storm-resistant shelter on impervious surface • Coco hydration water collection system separate from stormwater system • Fiber rolls • Spills/leaks contained and cleaned • Spill kits • Employee training • Routine inspections and housekeeping • Filtrexx Soxx

Table 2.1 Summary of Potential Pollutant Sources and Corresponding BMPs[a]

Industrial Activity and Drainage Area	Pollutant Source	Pollutant	BMPs
Amendment Storage Area (DMA-1, 2, 3, 4, and 5)	• Manures • Compost • Various powdered soil amendments	• Nitrates • Chemical Oxygen Demand • Total Suspended Solids • Phosphorus	• Manures and powdered amendments are kept in palletized totes under a storm-resistant shelter in DMA-1, 2, 3, and 5 • Compost is kept in a storm-resistant shelter in DMA-5
Sawdust storage and Forest Humus Aging (DMA-4 and 10)	• Trucks and Vehicles • Equipment • Leaks and spills • Amendments	• Lubricants • Hydraulic Oil • Diesel • Dust particles • Total Suspended Solids • Chemical Oxygen Demand	• Stockpile covers, as feasible • Paved storage areas and access roads • Street sweeping • Daily inspection • Spill kits on equipment • Spills/leaks contained and cleaned • Employee training • Timing work during times of low wind speed • Trees planted • Fiber rolls and Filtrexx Soxx • Vegetated swales • Sediment traps and detention ponds • Sand filter and bioswale in DMA-10

[a] BMPs: best management practices

2.2.2 Significant Spills and Leaks

Spill response materials (such as, oil absorbent pads and booms, granular absorbent material, containment bags, and chemical resistant PPE) are stored in garbage can spill kits, along with brooms and square shovels to contain and clean-up spills. These kits are stored in the maintenance building and at the fuel station where they are easily accessible and close to the areas of highest spill potential due to concentrated activity (see Appendix A). Portable spill kits are contained in forklifts, loaders and other equipment used on the site in case of mechanical failure such as a hydraulic line rupture. In the event of a large spill, the coco-based soil materials used on this site are highly absorbent and can quickly and easily be applied as berms and sheets with nearby equipment (such as, bucket loaders to stop, contain, and absorb any spilled materials). A large quantity could then be quickly moved underneath a roofed building. Employees carry handheld communications radios and/or cell phones for quick communication and rapid response to any potential emergencies. Periodic employee training covers spill control and response.

Table 2.2 includes industrial materials where spills and leaks have the potential to occur, and includes material characteristics, quantities, locations, and containers. Spills and leaks will be prevented by implementing the BMPs described in Section 3.

Table 2.2 Summary of Chemical Storage

Location	Contents	Capacity and Container Type
Fueling Station	Diesel Fuel	2, 500-gallon Double Wall Steel Tanks
Maintenance Shop	Acetylene	450 cubic feet Cylinder
Fueling Station	Gasoline	110-gallon Steel Tank
Maintenance Shop	Waste Oil	2, 55-gallon Steel Drum
Fueling Station	Liquefied Petroleum Gas	200-gallon Cylinder
Maintenance Shop	Used Oil Filters (Drained)	55-gallon Steel Drum
Maintenance Shop	Oxygen	560-cubic foot Cylinder
Maintenance Shop	Neem Oil	55-gallon Plastic Drum
Maintenance Shop	Argon	356-cubic foot Cylinder

2.3 Identification of Non-Stormwater Discharges

Non-stormwater discharges (NSWDs) consist of discharges which do not originate from precipitation events. The General Permit provides allowances for specified NSWDs provided they:

- Do not cause erosion
- Do not carry other pollutants
- Are not prohibited by the local MS4
- Do not require a separate National Pollutant Discharge Elimination System (NPDES) Permit from the Regional Water Board

NSWDs into storm drainage systems or waterways, which are not authorized under the General Permit and listed in the SWPPP, or authorized under a separate NPDES permit, are prohibited.

Monthly visual observations will be conducted according to the General Permit (Section XI.A.1) to ensure adequate BMP implementation and effectiveness. Monthly visual observations include observations for

evidence of unauthorized NSWDs. Steps will be taken, including the implementation of appropriate BMPs as defined in Section 3, to ensure that unauthorized NSWDS are eliminated, controlled, disposed offsite, or treated onsite.

Non-operations related, authorized discharges exist from the two emergent groundwater seeps flowing onsite (as described in Section 2.1.4). One seep runs on to the facility above the northern packing shed on the hillside, which flows into the conveyance leading to discharge location 1. The other seep flows south from the hillside to the west of the stormwater ponds. This runon is conveyed through culverts under the road and into vegetated channels for filtration and velocity reduction and then to the stormwater pond system.

"No Trespassing" signs have been posted around the site to dissuade unauthorized entry on the site. Additionally, fences and entry gates have been installed at the three entry/entrance points to the site. These measures eliminate the threat of unauthorized vehicles from entering the site to dump unauthorized materials.

2.4 Operations Schedule

The Royal Gold facility is typically open from Monday to Friday 7a.m. to 5p.m. During the operation's busy period, the facility is open as late as 7p.m. and on Saturday from 7a.m. to as late as 7p.m. Occasionally the facility will open earlier and close later than the aforementioned times. The site is closed on Sundays and major holidays.

2.5 Required Site Maps Information

Facility location and site maps are provided in Appendix A, and include the information required by the General Permit. Table 2.3 summarizes information provided in the site maps.

Table 2.3 Required Site Map Information Checklist

Included on Site Maps? Yes/No/ NA[a]	Required Element
Yes	The facility boundary
Yes	Stormwater drainage areas within the facility boundary
Yes	Portions of any drainage area impacted by discharges from surrounding areas
Yes	Flow direction of each drainage area
Yes	On-facility surface water bodies
NA	Areas of soil erosion
Yes	Location of nearby water bodies (such as, rivers, lakes, wetlands, and so on)
NA	Location of municipal storm drain inlets that may receive the facility's industrial stormwater discharges and authorized NSWDs[b]
Yes	Locations of stormwater collection and conveyance systems and associated points of discharge, and direction of flow
Yes	Any structural control measures (that affect industrial stormwater discharges, authorized NSWDs, and runon)

Table 2.3 Required Site Map Information Checklist

Included on Site Maps? Yes/No/ NA[a]	Required Element
Yes	Impervious areas of the facility, including paved areas, buildings, covered storage areas, or other roofed structures
Yes	Locations where materials are directly exposed to precipitation
NA	Locations where significant spills or leaks (Section X.G.1.d of the General Permit) have occurred
Yes	Areas of industrial activity subject to the General Permit
Yes	Storage areas and storage tanks
Yes	Shipping and receiving areas
Yes	Fueling areas
Yes	Vehicle and equipment storage/maintenance areas
Yes	Material handling and processing areas
Yes	Waste treatment and disposal areas
Yes	Dust or particulate generating areas
Yes	Cleaning and material reuse areas
Yes	Any other areas of industrial activity which may have potential pollutant sources

[a] NA: not applicable

[b] NSWDs: non-stormwater discharges

Section 3 Best Management Practices

3.1 Minimum BMPs

Minimum BMPs that are required by the General Permit will be implemented. Guidance for BMP implementation is provided in the CASQA Stormwater "Best Management Practice Handbook: Industrial and Commercial" (CASQA, 2014) fact sheets; the relevant fact sheets are included in Appendix E.

Sections 3.1.1 through 3.1.5 list the requirements for each of these minimum BMPs. Minimum BMPs will be implemented for additional targeted industrial activities, equipment, and materials, as necessary. If required minimum BMPs are applicable but cannot be implemented, an explanation and alternative approach will be provided in the following sections. Employee Training, described in Section 3.1.6, and quality assurance and record keeping, described in Section 3.1.7, are additional minimum BMPs that will be implemented. As required by the General Permit, a summary of the implemented BMPs is included in Table 2.1. The schedule for BMP implementation and the requirements for inspection and maintenance are presented in Section 4.

3.1.1 Good Housekeeping

The following good housekeeping measures will be implemented in accordance with the General Permit (Section X.H.1.a):

- Observe and identify outdoor areas associated with industrial activity including stormwater discharge locations, drainage areas, conveyance systems, waste handling/disposal areas, and perimeter areas impacted by off-facility materials or stormwater runon; clean and properly dispose of debris, waste, spills, tracked materials, or leaked materials.
- Minimize or prevent material tracking.
- Minimize dust generated from industrial materials or activities.
- Ensure that facility areas impacted by rinse/wash waters are cleaned as soon as possible.
- Cover stored industrial materials that can be readily mobilized by contact with stormwater.
- Contain stored non-solid industrial materials or wastes (such as, particulates, powders, shredded paper, etc.) that can be transported or dispersed by the wind or contact with stormwater.
- Prevent disposal of rinse/wash waters or industrial materials into the stormwater conveyance system.
- Minimize stormwater discharges from non-industrial areas (such as, stormwater flows from employee parking area) that contact industrial areas of the facility.
- Minimize authorized NSWDs from non-industrial areas (such as, potable water, fire hydrant testing, etc.) that contact industrial areas of the facility.

Table 3.1 (on the following page) lists the five minimum General Permit BMP elements that are included in the relevant BMP fact sheets and indicates which BMPs are implemented at the facility. BMP fact sheets are included in Appendix E.

3.1.2 Preventative Maintenance

The following preventative maintenance measures will be implemented in accordance with the General Permit (Section X.H.1.b):

- Table 2.2 identifies equipment and systems that may spill or leak pollutants.
- Observe the identified equipment and systems to detect leaks or identify conditions that may result in the development of leaks.
- Establish an appropriate schedule for maintenance of identified equipment and systems.
- Establish procedures for prompt maintenance and repair of equipment, and maintenance of systems when conditions exist that may result in the development of spills or leaks.

Specific preventative maintenance BMPs to be implemented at the facility are provided in Table 3.1; BMP fact sheets are included in Appendix E.

3.1.3 Spill and Leak Prevention and Response

The following spill and leak prevention and response measures will be implemented in accordance with the General Permit (Section X.H.1.c):

- Establish procedures and/or controls to minimize spills and leaks.
- Develop and implement spill and leak response procedures to prevent industrial materials from discharging through the stormwater conveyance system. Spilled or leaked industrial materials will be cleaned promptly and disposed of properly.
- Identify and describe necessary and appropriate spill and leak response equipment, locations of spill and leak response equipment, and spill or leak response equipment maintenance procedures.
- Identify and train appropriate spill and leak response personnel.

Specific spill and leak prevention and response BMPs to be implemented at the facility are provided in Table 3.1; the BMP fact sheets are included in Appendix E.

Table 3.1 Minimum BMPs[a]

CASQA[b] Fact Sheet Number	CASQA BMP Fact Sheet Name	Addresses Minimum General Permit BMP Requirements				
		Good Housekeeping	Preventative Maintenance	Spill and Leak Prevention and Response	Material Handling and Waste Management	Erosion and Sediment Control
EC-1	Scheduling	✓	✓			
EC-2	Preservation of Existing Vegetation					✓
EC-6	Straw Mulch					✓
EC-7	Geotextiles & Mats					✓
EC-8	Wood Mulching					✓
EC-9	Earth Dikes & Drainage Swales					✓
SE-3	Sediment Trap					✓
SE-5	Fiber Rolls					✓
SE-6	Gravel Bag Berm					✓
SE-7	Street Sweeping and Vacuuming	✓				✓
SE-10	Storm Drain Inlet Protection					✓
WE-1	Wind Erosion Control					✓
NS-1	Water Conservation Practices	✓				✓
NS-6	Illicit Connection/Discharge	✓	✓			
WM-1	Material Delivery & Storage				✓	
WM-2	Material Use	✓	✓		✓	
WM-3	Stockpile Management	✓	✓			✓
WM-4	Spill Prevention & Control		✓	✓		
WM-5	Solid Waste Management	✓	✓		✓	
WM-7	Contaminated Soil Management				✓	
WM-8	Concrete Waste Management	✓			✓	
WM-9	Sanitary/Septic Waste Management	✓	✓	✓	✓	
SC-10	Non-Stormwater Discharges	✓		✓	✓	
SC-11	Spill Prevention, Control, and Cleanup	✓	✓	✓	✓	
SC-20	Vehicle and Equipment Fueling	✓	✓	✓	✓	

SC-21	Vehicle and Equipment Cleaning	✓	✓	✓	✓	
CASQA Fact Sheet Number	CASQA BMP Fact Sheet Name	Addresses Minimum General Permit BMP Requirements				
		Good Housekeeping	Preventative Maintenance	Spill and Leak Prevention and Response	Material Handling and Waste Management	Erosion and Sediment Control
SC-22	Vehicle and Equipment Maintenance and Repair	✓	✓	✓	✓	
SC-30	Outdoor Loading and Unloading	✓		✓	✓	
SC-31	Outdoor Liquid Container Storage	✓	✓	✓	✓	
SC-32	Outdoor Equipment Operations	✓	✓	✓	✓	
SC-33	Outdoor Storage of Raw Materials	✓	✓	✓	✓	✓
SC-34	Waste Handling and Disposal	✓	✓	✓	✓	
SC-40	Contaminated or Erodible Surfaces		✓		✓	✓
SC-41	Building and Grounds Maintenance	✓		✓	✓	✓
SC-43	Parking Area Maintenance	✓	✓	✓		
SC-44	Drainage System Maintenance	✓	✓	✓		✓
SC-34	Waste Handling and Disposal	✓	✓	✓	✓	
SC-60	Housekeeping Practices	✓	✓			✓

[a] BMPs: best management practices
[b] CASQA: California Stormwater Quality Association

3.1.4 Material Handling and Waste Management

The following material handling and waste management measures will be implemented in accordance with the General Permit (Section X.H.1.d):

- Prevent or minimize handling of industrial materials or wastes that can be readily mobilized by contact with stormwater during a storm event.
- Contain stored non-solid industrial materials or wastes (such as, particulates, powders, shredded paper, etc.) that can be transported or dispersed by the wind or contact with stormwater during handling.
- Cover industrial waste disposal containers and industrial material storage containers that contain industrial materials when not in use.
- Divert runon and stormwater generated from within the facility away from stockpiled materials.
- Clean spills of industrial materials or wastes that occur during handling in accordance with the spill response procedures (Section X.H.1.c).
- Observe and clean as appropriate, outdoor material or waste handling equipment or containers that can be contaminated by contact with industrial materials or wastes.

Specific material handling and waste management BMPs to be implemented at the facility are provided in Table 3.1; BMP fact sheets are included in Appendix E.

3.1.5 Erosion and Sediment Controls

The following erosion and sediment control measures will be implemented in accordance with the General Permit (Section X.H.1.e):

- Implement effective wind erosion controls.
- Provide effective stabilization for disturbed soils and other erodible areas prior to a forecasted storm event.
- Maintain effective perimeter controls and stabilize site entrances and exits to have sufficient control of discharges of erodible materials from discharging or being tracked off the site.
- Divert runon and stormwater generated from within the facility away from erodible materials.

Specific erosion and sediment control BMPs to be implemented at the facility are provided in Table 3.1; BMP fact sheets are included in Appendix E.

3.1.6 Employee Training Program

An employee training program will be implemented in accordance with the following requirements in the General Permit (Section X.H.1.f):

- Ensure that team members implementing the various compliance activities of this SWPPP are properly trained in topics including but not limited to: BMP implementation, BMP effectiveness evaluations, visual observations, and monitoring activities.
- Prepare or acquire appropriate training manuals or training materials.

- Identify which personnel need to be trained, their responsibilities, and the type of training they will receive.
- Provide a training schedule.
- Maintain documentation of completed training classes and the personnel that received training in the SWPPP.

Task-specific training for employees engaged in activities that have the potential to cause stormwater pollution will be conducted when new employees are hired, and refresher training will be provided annually. Each team member will be trained in the specific role to which he or she is responsible to undertake. Training will be performed by the personnel identified in Table 1.1 or as needed by the QISP. The trainer will be responsible for providing information during training sessions and subsequently completing the training logs shown in Appendix C, which identifies the site-specific stormwater topics covered, as well as the names of site personnel who attended the meeting.

3.1.7 Quality Assurance and Record Keeping

The following quality assurance and record keeping activities will be performed in accordance with the requirements in the General Permit (Section X.H.1.g):

- Develop and implement management procedures to ensure that appropriate staff implements elements of the SWPPP, including the monitoring implementation plan (MIP; SWPPP Section 5).
- Develop a method of tracking and recording the implementation of BMPs identified in the SWPPP.
- Maintain the BMP implementation records, training records, and records related to any spills and cleanup-related response activities for a minimum of five (5) years as required in the General Permit (Section XXI.J.4).

BMPs will be implemented by properly trained team members as documented in Appendix C. Visual observations will be performed as described in SWPPP Section 5.5. Potential pollutant sources and BMPs will be inspected during visual observations, and new BMPs will be implemented as needed.

Paper or electronic records of documents required by this SWPPP will be retained for a minimum of five (5) years from the date generated or date submitted, whichever is later, for the following items:

- Employee Training Records
- BMP Implementation Records
- Spill and Clean-up Related Records
- Records of Monitoring Information
  - The date, location, and time of sampling or measurement
  - The date analyses were performed
  - The name of the individual that performed the analyses
  - The analytical techniques or methods used
  - The results of such analyses
- Level 1 ERA Reports
- Level 2 ERA Action Plan
- Level 2 ERA Technical Report
- Annual Reports

3.2 Advanced BMPs

3.2.1 Exposure Minimization BMPs

Storm resistant shelters are installed onsite to prevent the contact of stormwater with industrial activities and material. The locations of these shelters and associated industrial activities and materials are presented in Table 3.2.

Table 3.2 Exposure Minimization BMPs[a]

Shelter Description/Location	Associated Industrial Activity/Material
Maintenance Shop–DMA-2	Equipment Repair, Fuel & Chemical Storage
Bagging Lines–DMA-1 and DMA-2	Bagging of soil and amendments
Lower Shop DMA-2	Hydration and Grinding of Coco
Compost Storage–DMA-5	Compost Storage
Coco Barn–DMA-4	Hydration and Grinding of Coco
Peat Barn–DMA-5	Grinding Bales of Peat Moss and Storage

[a] BMPS: best management practices

3.2.2 Stormwater Containment and Discharge Reduction BMPs

Stormwater containment and discharge reduction BMPs include BMPs that divert, reuse, contain, or reduce the volume of stormwater runoff. Specific stormwater containment and discharge reduction BMPs implemented at the facility are provided in Table 3.3 (on the following page) and the BMP fact sheets are included in Appendix E.

Table 3.3 Advanced BMPs[a]

CASQA[b] Fact Sheet Number	CASQA BMP Fact Sheet Name	BMP Location
EC-10	Velocity Dissipation Devices	DMA-4 (Rock check dams & gabions)
TC-12	Harvest and Reuse	Rainwater storage tank(s) throughout site where necessary
TC-30	Vegetated Swale	DMA1, DMA-2, DMA-3, DMA-4, and DMA-9
TC-31	Vegetated Buffer Strip	DMA-1, 4, 9, and 10
TC-32	Bioretention	DMA-4, 5, and 8 (Combined with SE-3)
TC-40	Sand Filter	DMA-10
TC-60	Multiple Systems	DMA1, DMA-2 and DMA-3

[a] BMPs: best management practices
[b] CASQA: California Stormwater Quality Association

Section 4 BMP Implementation

4.1 BMP Implementation Schedule

The schedule for implementing minimum and advanced BMPs is presented in Table 4.1 (on the following page). BMPs will be implemented as necessary to reduce or prevent transport of industrial pollutants in stormwater runoff. Slight modifications to this schedule may be necessary to achieve this goal.

In general employee training and routine inspections will be completed by a pollution prevention team member.

4.2 BMP Inspection and Maintenance

The General Permit requires, at a minimum, monthly observations of BMPs, as well as inspections during sampling events. Monthly observations will be conducted during daylight hours of scheduled facility operating hours and on days without precipitation.

A BMP observation checklist must be completed for each inspection and shall be maintained onsite with the SWPPP. The observation checklist includes the necessary information as discussed in Section 5.5. A blank observation checklist can be found in Appendix H and completed checklists will be kept in an accompanying file/binder that is readily accessible onsite.

BMPs will be maintained regularly to ensure proper and effective functionality. If necessary, corrective actions will be implemented as soon as possible following identified deficiencies and associated amendments to the SWPPP will be prepared and documented.

Specific guidance for maintenance, observation, and repair of advanced BMPs can be found in the BMP fact sheets in Appendix E.

Table 4.1 BMP[a] Implementation Schedule

Industrial Activity and Drainage Area	BMPs	Responsible Party for Implementing BMP	Frequency of Implementation
Facility Entrance (DMA-3) and Access Roads (DMA1-10)	Tracked materials swept (manually & street sweeper)	Operators & BMP Crew	Daily
	Replace fiber rolls, Filtrexx Soxx, silt fences, gravel bags	BMP Crew & Mgmt.[b]	As needed
	Water truck used as needed during dry periods	BMP Crew	As needed
	Metal and oil absorbent booms as necessary in flow paths	Operators & BMP Crew	As needed
	Routine inspection of roads	BMP Crew & Mgmt.	Daily
	Implement road maintenance	BMP Crew	As needed
	Spills/leaks contained and cleaned	Operators, BMP Crew, & Mgmt.	As needed
Maintenance Shop and Fueling (DMA-2)	Storm-resistant shelter maintained	BMP Crew & Mgmt.	As needed
	Vehicle/equipment cleaning/fueling/maintenance	Operators, Mechanics	As needed
	Routine inspection of equipment for leaks or spills	Operators, Mechanics	Daily
	Spill kits maintained	BMP Crew, Mgmt.	Semiannually
	Spills/leaks maintained	Operators, BMP Crew, Mechanics	As Needed
Bulk Yard (DMA-4 and DMA-5)	Metal and oil absorbent booms as necessary in flow paths	BMP Crew	As needed
	Replace fiber rolls, Filtrexx Soxx, silt fences	BMP Crew	As needed
	Remove accumulated sediment/material from paved areas	BMP Crew	As needed
	Spill kits maintained	BMP Crew, Mgmt.	Semiannually
	Spills/leaks maintained	Operators, BMP Crew, Mechanics	As Needed
	Routine inspections	Operators, BMP Crew	Daily
	Stockpile covers (as feasible) maintained	Operators, BMP Crew	As needed

Table 4.1 BMP[a] Implementation Schedule

Industrial Activity and Drainage Area	BMPs	Responsible Party for Implementing BMP	Frequency of Implementation
Bagging Line (DMA-1 and DMA-2)	Metal and oil absorbent booms as necessary in flow paths	BMP Crew	As needed
	Replace fiber rolls, Filtrexx Soxx, silt fences	BMP Crew	As needed
	Remove accumulated sediment/material from paved areas	BMP Crew	As needed
	Storm-resistant shelter maintained	BMP Crew & Mgmt.	As needed
	Maintain vegetated swales	BMP Crew	As needed
	Maintenance of sediment traps	BMP Crew	As needed
	Routine inspection of geotextile screen	BMP Crew	Monthly
	Routine inspection of amendment dust hut	Mgmt.	Daily
	Paved areas swept	BMP Crew, Operators	As needed
Coco Hydration (DMA-2 and 4)	Storm-resistant shelter maintained	BMP Crew	As needed
	Pond & filtration system maintained	BMP Crew	As needed
	Linear controls maintained and replaced	BMP Crew	As needed
	Paved area swept	BMP Crew, Operators	As needed
	Routine inspection	Operators, BMP Crew	As needed
	Replace fiber rolls, Filtrexx Soxx, silt fences	BMP Crew	As needed
	Remove accumulated sediment/material from paved areas	BMP Crew	As needed
Sawdust and Forest Humus (DMA-4 and 10)	Replace fiber rolls, Filtrexx Soxx, gravel bags	BMP Crew	As needed
	Sweep up windblown material collected at blocks	BMP Crew	As needed
	Paved areas swept	BMP Crew	As needed
	Routine Inspection	BMP Crew & Mgmt.	Daily
	Stockpile covers (as feasible) maintained	Operators	As needed
	Maintenance of sediment traps	BMP Crew	As needed
	Screens maintained	BMP Crew/Maintenance	As needed

[a] BMP: best management practice
[b] Mgmt.: Management

Section 5 Monitoring Implementation Plan

5.1 Purpose

This monitoring implementation plan (MIP) was developed to address the following objectives:

- Identify the monitoring team.
- Describe weather and rain event tracking procedures.
- Describe discharge locations and visual observations procedures.
- Describe visual observation response procedures.
- Describe sample collection and handling procedures.
- Describe field instrumentation calibration instructions and intervals.
- Provide justification for alternative discharge locations, representative sample reduction (RSR), and qualified combined samples (QCS), as applicable.
- Provide an example chain-of-custody form to be used when handling and shipping water quality samples to the laboratory.

5.2 Weather and Rain Event Tracking

Stormwater sampling and visual observations will be conducted during qualified storm events (QSEs). A QSE is defined as any precipitation event that produces a discharge for at least one drainage area and is preceded by 48 hours with no discharge from any drainage area. Weather and precipitation forecasts will be tracked to identify potential QSEs.

When targeting a QSE for stormwater sampling, the appropriate team member will consult weekly National Oceanographic and Atmospheric Administration (NOAA) weather forecasts. These forecasts can be obtained at http://www.srh.noaa.gov/. If weekly forecasts indicate potential for significant precipitation, the weather forecast will be closely monitored during the 48 hours preceding the event. Weather reports are monitored at least daily.

5.3 Monitoring Locations

Monitoring locations are described in Section 5.6, and are shown on Figure 2 in Appendix A.

Whenever changes in facility operations might affect the appropriateness of sampling locations, the sampling locations will be revised accordingly. Revisions will be implemented as soon as feasible and the SWPPP amended.

5.4 Sample Collection and Visual Observation Exceptions

The collection of samples or conducting visual observations is not required under the following conditions:

- During dangerous weather conditions, such as, flooding and electrical storms
- Outside of scheduled site business hours

Scheduled site business hours are presented in Section 2.4.

If monitoring (visual observations or sample collection) of the site is unsafe because of the dangerous conditions noted above, then the appropriate team member will document the conditions under which an exception to performing the monitoring was necessary. The exception documentation will be filed in a separate binder containing monitoring documents kept onsite.

5.5 Visual Observation Procedures

Visual monitoring includes observations of drainage areas, BMPs, and discharge locations.

- Observations of BMPs are required to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended.
- Observations of the drainage areas are required to identify any spills, leaks, uncontrolled pollutant sources, and non-stormwater discharges.
- Observations of discharge locations are required to identify the presence of visible pollutants in stormwater discharged from the facility.

Visual observations will be performed at least once every calendar month during dry conditions. Visual observations will also be performed during stormwater sampling events when discharge is occurring.

5.5.1 Monthly Visual Observations

Monthly visual observations are necessary to document the presence and source of pollutants and non-stormwater flows. These should consist of observations of the outdoor facility operations, BMPs, and NSWD observations. In the event that monthly visual observations are not performed, an explanation must be provided in the annual report.

5.5.1.1 Outdoor Facility Operations Observations

Observe potential sources of industrial pollutants including industrial equipment and storage areas, and outdoor industrial activities. Record observations of:

- Spills or leaks
- Uncontrolled pollutant sources

5.5.1.2 BMP Observations

Observe BMPs to identify and record BMPs that:

- Are properly implemented
- Need maintenance to operate effectively
- Have failed
- May fail to operate as intended

5.5.1.3 Non-Stormwater Discharge Observations

Observe each industrial activity area for the presence of or indications of prior unauthorized and authorized non-stormwater discharges. Record:

- Presence or evidence of any non-stormwater discharge (authorized or unauthorized)
- Pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.)
- Source of discharge

For authorized non-stormwater discharges, also document whether BMPs are in place and are functioning to prevent contact with materials or equipment that could introduce pollutants

5.5.2 Sampling Event Visual Observations

Sampling event visual observations evaluate the general appearance of the stormwater as an indicator of potential pollutants. These observations will be conducted at the same time sampling occurs at the discharge locations identified in Section 5.6.2.

At each discharge location where a sample is obtained, record observations of:

- Floating and suspended materials
- Oil and grease
- Discoloration
- Turbidity
- Odors
- Trash

When pollutants are observed in the discharged stormwater, follow-up observations of the drainage area will be conducted to identify the probable source of the pollutants. In the event that a discharge location is not visually observed during the sampling event, the location of the discharge and reasoning for not obtaining observations must be recorded.

5.5.3 Visual Monitoring Procedures

Visual monitoring will be conducted by trained team members. The names and contact numbers of the site visual monitoring personnel are listed below and their training qualifications are provided in Appendix C.

Clinton Betts	(707) 822-4653

Visual observations will be documented on the "Visual Observation Log." Visual observations will be supplemented with a site-specific BMP inspection checklist. If photographs are used to document observations, they will be referenced on the "Visual Observation Log" and maintained in Appendix F.

5.5.4 Visual Monitoring Follow-Up and Reporting

Correction of deficiencies identified by the observations, including required repairs or maintenance of BMPs will be initiated and completed as soon as possible. Response actions will include the following:

- Report observations to the Pollution Prevention Team Leader or designated individual.
- Identify and implement appropriate response actions.
- Determine if SWPPP update is needed.
- Verify completion of response actions.
- Document response actions.

If identified deficiencies require design changes, including additional BMPs, the implementation of changes will be completed as soon as possible, and the SWPPP will be amended to reflect the changes.

BMP deficiencies identified in site observation reports and correction of deficiencies will be tracked on the "BMP Observation Checklist" and will be retained in Appendix F.

Results of visual monitoring must be summarized and reported in the annual report.

5.5.5 Visual Monitoring Locations

The observations identified as described in Sections 5.5.1 and 5.5.2 will be conducted at the locations identified in this section.

5.6 Sampling and Analysis Procedures

This section describes the methods and procedures that will be followed for stormwater sampling and analysis. It contains information for sampling schedule, sampling locations, monitoring preparation, analytical constituents, sample collection, sample analysis, and data evaluation and reporting.

5.6.1 Sampling Schedule

This facility is part of a compliance group established in accordance with Section XIV of the General Permit. Stormwater samples at each discharge location will be collected and analyzed from one (1) QSE within the first half of each reporting year (July 1 to December 31), and one (1) QSE within the second half of each reporting year (January 1 to June 30).

A QSE is a precipitation event that:

- Produces a discharge for at least one drainage area
- Is preceded by 48 hours with no discharge from any drainage area

5.6.2 Sampling Locations (Latitude and Longitude)

Sampling locations include locations where stormwater is discharged from the site. Approximate discharge locations are shown on Figure 2 in Appendix A and are included in Table 5.1.

Table 5.1 Stormwater Discharge Locations

Location Identifier	Latitude/ Longitude
DMA-1	40.900564°, -124.023409°
DMA-2	40.900436°, -124.023223°
DMA-3	40.900630°, -124.020696°
DMA-4	40.901059°, -124.019437°
DMA-5	40.900574°, -124.018951°
DMA-6	40.900297°, -124.017584°
DMA-8	40.900808°, -124.017890°
DMA-9	40.901515°, -124.017904°
DMA-10	40.903295°, -124.021092°

5.6.3 Monitoring Preparation

Samples on the project site may be collected by the following sampling personnel:

Clinton Betts (707) 822-4653

Sampling personnel will be available to collect samples in accordance with the sampling schedule.

An adequate stock of monitoring supplies and equipment for sampling will be available onsite prior to a sampling event. Monitoring supplies and equipment will be stored in a cool environment that will prevent them from coming into contact with rain or direct sunlight. Supplies maintained at the facility will include, but are not limited to:

- Clean powder-free latex or nitrile gloves; sample collection equipment
- Coolers
- Appropriate number and volume of sample containers
- Identification labels
- Re-sealable storage bags
- Paper towels
- Personal rain gear
- Ice
- "Sampling Field Log Sheets" and chain-of-custody (CoC) forms, which are provided in "MIP Attachment 3: Example Forms"

5.6.4 Analytical Constituents

Table 5.2 identifies the constituents identified for sampling and analysis. The SIC code for the site is 2875. There are no additional constituents required for this SIC code.

Table 5.2 Analytical Constituents

Constituent	Reason	Sample Locations
pH	Basic required constituent	DMA-1, 2, 3, 4, 5, 6, 8, 9, and 10
Oil and grease (O&G)		
Total Suspended Solids (TSS)		
Iron	Required per SIC 2875	
Lead		
Zinc		
Phosphorus		
Nitrate + Nitrite		
Chemical Oxygen Demand	Pollutant Source Assessment	

5.6.5 Sample Collection

Samples of discharge will be collected at the designated discharge locations summarized in Table 5.1 and shown on Figure 2 in Appendix A. Samples from each discharge location will be collected within four (4) hours of:

- The start of the discharge
- The start of facility operations if the QSE occurs within the previous 12-hour period

Sample collection is required during scheduled facility operating hours when sampling conditions are safe.

Grab samples will be collected and preserved in accordance with the methods identified in Table 5.3. Sample collection and handling requirements are described in Section 5.8. Only team members properly trained in water quality sampling will collect samples.

Grab samples will be collected and analyzed for pH using a portable pH meter, following the instrument calibration requirements and manufacturer information in "MIP Attachment 4: Field Meter Instructions." The pH analysis will be performed as soon as practicable, but no later than 15 minutes after sample collection.

5.6.6 Sample Analysis

Samples will be analyzed using the analytical methods identified in the Table 5.3. Samples will be analyzed by:

Laboratory Name:	North Coast Laboratories
Street Address:	5680 West End Road
City, State, Zip:	Arcata, CA 95521
Telephone Number:	(707) 822-4649
Point of Contact:	Roxanne Moore
ELAP Certification Number:	#1247

Table 5.3 Sample Collection, Preservation and Analysis for Water Quality Samples

Constituent	Analytical Method	Minimum Sample Volume	Sample Containers	Sample Preservation	Reporting Limit	Maximum Holding Time
pH	pH Units (see Section X1.C.2 of the IGP[a])	Field or Container	500 ml[b] plastic (with TSS)	None	pH 1 to 12	15 minutes
Total Suspended Solids (TSS)	SM 2540-D	500 ml	500 ml plastic (with pH, N+N)	None	1.0 mg/L[c]	7 days
Oil and Grease (O&G)	EPA 1664-A	2 liters	Two 1-liter brown glass	HCl[d]	5 mg/L	14 days
Iron	EPA 200.7 Total Recoverable	500 ml	250 ml plastic	HNO_3 [e]	50 ug/L[f]	6 months
Zinc						
Lead						
Phosphorus	SM 4500-P B+E	500 ml	250 ml plastic	H_2SO_4 [g]	0.033 mg/L	28 days
Chemical Oxygen Demand (COD)	SM5220D	500 ml	250 ml plastic	H_2SO_4	50 mg/L	28 days
Nitrate + Nitrite Nitrogen	EPA 300.0 Rev 2.1 (1993)	500 ml	500 ml plastic	None	0.02 mg/L	2 days

[a] IGP: Industrial General Permit (See Appendix G)
[b] ml: milliliters
[c] mg/L: milligrams per liter
[d] HCl: hydrochloric acid
[e] HNO_3: nitric acid
[f] ug/L: micrograms per liter
[g] H_2SO_4: sulfuric acid

5.6.7 Data Evaluation and Reporting

The designated member of the Pollution Prevention Team will complete an evaluation of the water quality sample analytical results.

Sampling and analytical results for individual samples will be submitted using SMARTS within 30 days of obtaining results for each sampling event. The method detection limit will be provided when an analytical result from samples taken is reported by the laboratory as a "non-detect" or less than the method detection limit. A value of zero will not be reported. Analytical results that are reported by the laboratory as below the minimum level (often referred to as the reporting limit) but above the method detection limit will be provided.

Reported analytical results will be averaged automatically by SMARTS at the end of the reporting year. For any calculations required by the General Permit a value of zero shall be used for effluent sampling analytical results that are reported by the laboratory as "non-detect" or less than the method detection limit (MDL).

5.7 Training of Sampling Personnel

Sampling personnel will be trained to collect, maintain, and ship samples in accordance with the General Permit and this SWPPP. Training records of designated sampling personnel are provided in Appendix C.

5.8 Sample Collection and Handling

5.8.1 Sample Collection

Samples will be collected at the designated sampling locations shown on Figure 2 in Appendix A and listed in the preceding sections. Samples will be collected, maintained, and shipped in accordance with the requirements in the following sections.

Grab samples will be collected and preserved in accordance with the methods identified in preceding sections.

To maintain sample integrity and prevent cross-contamination, sample collection personnel will follow the protocols below.

- Collect samples (for laboratory analysis) only in analytical laboratory-provided sample containers.
- Wear clean, powder-free latex or nitrile gloves when collecting samples.
- Change gloves whenever something not known to be clean has been touched.
- Change gloves between sites.
- Do not smoke during sampling events.
- Never sample near a running vehicle.
- Do not park vehicles in the immediate sample collection area (even when they are not running).
- Do not eat or drink during sample collection.
- Do not breathe, sneeze, or cough in the direction of an open sample container.

The most important aspect of grab sampling is to collect a sample that represents the entire runoff stream. Typically, samples are collected by dipping the collection container in the runoff flow paths and streams as noted below.

- For small streams and flow paths, simply dip the bottle facing upstream until full.
- For larger stream that can be safely accessed, collect a sample in the middle of the flow stream by directly dipping the mouth of the bottle. Once again making sure that the opening of the bottle is facing upstream as to avoid any contamination by the sampler.
- For larger streams that cannot be safely waded, pole-samplers may be needed to access the representative flow safely.
- Avoid collecting samples from ponded, sluggish, or stagnant water.
- Avoid collecting samples directly downstream from a bridge—the samples can be affected by the bridge structure or runoff from the road surface.
- Do not stand upstream of the sampling point within the flow path.

Note, that depending upon the specific analytical test, some containers may contain preservatives. These containers should **never** be dipped into the stream but filled indirectly from the collection container.

5.8.2 Sample Handling

Field pH measurements must be conducted immediately. Do not store pH samples for later measurement.

Samples for laboratory analysis must be handled as follows. Immediately following sample collection:

- Cap sample containers.
- Complete sample container labels.
- Seal containers in a re-sealable storage bag.
- Place sample containers into an ice-chilled cooler.
- Document sample information on the “Sampling Field Log Sheet.”
- Complete the CoC form.

Samples for laboratory analysis must be maintained between 0-6 degrees Celsius during delivery to the laboratory. Samples must be kept on ice, or refrigerated, from sample collection through delivery to the laboratory. Place samples to be shipped inside coolers with ice. Make sure the sample bottles are well packaged to prevent breakage and secure cooler lids with packaging tape.

Ship samples that will be laboratory analyzed to the analytical laboratory right away. Hold times are measured from the time the sample is collected to the time the sample is analyzed. The General Permit requires that samples be received by the analytical laboratory within 48 hours of the physical sampling (unless required sooner by the analytical laboratory).

5.8.3 Sample Documentation Procedures

Data documented on sample bottle identification labels, "Sampling Log," and CoCs will be recorded using waterproof ink. If an error is made on a document, sampling personnel will make corrections by lining through the error and entering the correct information. The erroneous information will not be obliterated. Corrections will be initialed and dated.

Duplicate samples will be identified consistent with the numbering system for other samples to prevent the laboratory from identifying duplicate samples. Duplicate samples will be identified in the Sampling Log.

Sample documentation procedures include the following:

Sample Bottle Identification Labels: Sampling personnel will attach an identification label to each sample bottle. Sample identification will uniquely identify each sample location.

Field Log Sheets: Sampling personnel will complete the "Effluent Sampling Field Log Sheet" for each sampling event, as appropriate.

Chain-of-Custody: Sampling personnel will complete the CoC for each sampling event for which samples are collected for laboratory analysis. The sampler will sign the CoC when the samples are turned over to the testing laboratory or courier.

5.9 Quality Assurance and Quality Control

An effective quality assurance and quality control (QA/QC) plan will be implemented as part of the MIP to ensure that analytical data can be used with confidence. QA/QC procedures to be initiated include the following:

- Field logs
- Clean sampling techniques
- CoCs
- QA/QC samples
- Data verification

Each of these procedures is discussed in more detail in the following sections.

5.9.1 Field Logs

The purpose of field logs is to record sampling information and field observations during monitoring that may explain any uncharacteristic analytical results. Sampling information to be included in the field log include the date and time of water quality sample collection, sampling personnel, sample container identification numbers, and types of samples that were collected. Field observations should be noted in the field log for any abnormalities at the sampling location (color, odor, BMPs, etc.). Field measurements for pH and turbidity should also be recorded in the field log. An "Effluent Sampling Field Log" sheet is included in "MIP Attachment 3: Example Forms."

5.9.2 Clean Sampling Techniques

Clean sampling techniques involve the use of certified clean containers for sample collection and clean powder-free latex or nitrile gloves during sample collection and handling. As discussed in Section 5.8, adoption of a clean sampling approach will minimize the chance of field contamination and questionable data results.

5.9.3 Chain-of-Custody

The CoC is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. CoC procedures include the following:

- Proper labeling of samples
- Use of CoC forms for samples
- Prompt sample delivery to the analytical laboratory

Analytical laboratories usually provide CoC forms to be filled out for sample containers. An example CoC is included in "MIP Attachment 3: Example Forms."

5.9.4 Data Verification

After results are received from the analytical laboratory, the discharger will verify the data to ensure that it is complete, accurate, and the appropriate QA/QC requirements were met. Data must be verified as soon as the data reports are received. Data verification will include:

- Check the CoC and laboratory reports.
  Make sure requested analyses were performed and samples are accounted for in the reports.
- Check laboratory reports to make sure hold times were met and that the reporting levels meet or are lower than the reporting levels agreed to in the contract.
- Check data for outlier values and follow up with the laboratory.
  Occasionally typographical errors, unit reporting errors, or incomplete results are reported and should be easily detected. These errors need to be identified, clarified, and corrected quickly by the laboratory. Especially note data that is an order of magnitude or more different from similar locations or is inconsistent with previous data from the same location.
- Check laboratory QA/QC results.
  EPA establishes QA/QC checks and acceptable criteria for laboratory analyses. This data is typically reported along with the sample results. Evaluate the reported QA/QC data to check for contamination (method, field, and equipment blanks), precision (laboratory matrix spike duplicates), and accuracy (matrix spikes and laboratory control samples). When QA/QC checks are outside acceptable ranges, the laboratory must flag the data, and usually provides an explanation of the potential impact to the sample results.
- Check the data set for outlier values and accordingly, confirm results and reanalyze samples where appropriate.
  Sample reanalysis should only be undertaken when it appears that some part of the QA/QC resulted in a value out of the accepted range. Sample results may not be discounted unless the analytical laboratory determines that the required QA/QC criteria were not met and confirms this finding in writing.

Field data, including pH measurements and visual observations, must be verified as soon as the Visual Observation and Sampling Logs are received, typically at the end of the monitoring event. Field data verification will include:

- Check logs to make sure required measurements were completed and appropriately documented.
- Check reported values that appear out of the typical range or that are inconsistent. Follow-up immediately to identify potential reporting or equipment problems, if appropriate, recalibrate equipment after sampling.
- Verify equipment calibrations.
- Review observations noted on the logs.
- Review notations of any errors and actions taken to correct the equipment or recording errors.

5.10 Records Retention

Records of stormwater monitoring information and copies of reports (including annual reports) must be retained for at least five (5) years from date of submittal or longer if required by the Regional Water Board.

Results of visual observations, field measurements, and laboratory analyses must be kept in the SWPPP along with CoCs, and other documentation related to the monitoring.

Records to be retained include:

- The date, place, and time of inspections, sampling, visual observations, and/or measurements, including precipitation
- The name(s) of the individual(s) who performed the inspections, sampling, visual observation, and/or field measurements
- The date and approximate time of field measurements and laboratory analyses
- The name(s) of the individual(s) who performed the laboratory analyses
- A summary of analytical results, the method detection limits, reporting limits, and the analytical techniques or methods used
- Any printed weather reports, as deemed appropriate to individual storm events
- QA/QC records and results
- Calibration records
- Visual observation and sample collection exception records
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections

MIP Attachment 1: Weather Reports

Any appropriate weather reports are kept digitally:

MIP Attachment 2: Monitoring Records

MIP Attachment 3: Example Forms

Visual Observation Log–Sampling Events			
Date and Time of Inspection:			Report Date:
Facility Name: **Royal Gold LLC** WDID: **1 12I025790**			
Weather			
Antecedent Conditions (last 48 hours):		Weather:	
Precipitation Total:		Predicted % chance of rain:	
Estimate storm beginning: (date and time)	Estimate storm duration:_____ (hours)	Estimate time since last storm: _____ (days or hours)	Rain gauge reading:_____ (inches)

Sampling Event Observations

Observations: If yes identify location and observe drainage area to identify probable cause

Odors	☐ Yes	☐ No
Floating Material	☐ Yes	☐ No
Suspended Material	☐ Yes	☐ No
Sheen	☐ Yes	☐ No
Discolorations	☐ Yes	☐ No
Turbidity	☐ Yes	☐ No

NSWD Observations

Was any authorized non-stormwater discharge observed?	☐ Yes	☐ No
Was any **unauthorized** non-stormwater discharge observed?	☐ Yes	☐ No

If yes to either, identify source:

Drainage Area Observations

Drainage Area	Deficiencies Noted

Exception Documentation (explanation required if inspection could not be conducted).

Inspector Information	
Inspector Name:	Inspector Title:
Signature:	Date:

Sampling Log										
Facility Name: **Royal Gold LLC** WDID: **1 12I025790**										
Sampler Name:			Date:		Time Start:					
Field Meter Calibration										
pH Meter ID No./Description: Calibration Date/Time:										
Field pH Measurements										
Discharge Location Identifier	pH		Time							
DMA-1										
DMA-2										
DMA-3										
DMA-4										
DMA-5										
DMA-6										
DMA-8										
DMA-9										
DMA-10										
Samples Collected										
	DMA									
Constituents	**DMA-1**	**DMA-2**	**DMA-3**	**DMA-4**	**DMA-5**	**DMA-6**	**DMA-7**	**DMA-8**	**DMA-9**	**DMA-10**
Oil and Grease (O&G)										
Total Suspended Solids (TSS)										
Iron (Fe)										
Nitrate + Nitrite (N+N)										
Lead (Pb)										
Zinc (Zn)										
Phosphorus (P)										
Chemical Oxygen Demand (COD)										
Additional Sampling Notes:										
Time End:										

NORTH COAST LABORATORIES LTD.
5680 West End Road · Arcata · CA 95521-9202
707-822-4649 Fax 707-822-6831

Chain of Custody

LABORATORY NUMBER:

Attention: _____
Results & Invoice to: _____
Address: _____
_____
Phone: _____
Copies of Report to: _____
_____
Sampler (Sign & Print): _____

PROJECT INFORMATION
Project Number: _____
Project Name: _____
Purchase Order Number: _____

TAT: ☐ RSC (2-3 Wk) ☐ Other:
PRIOR AUTHORIZATION IS REQUIRED FOR RUSH SAMPLES.

REPORTING REQUIREMENTS:
☐ State Forms
☐ Geotracker ☐ SWAMP ☐ Other EDD:
☐ Final Report PDF ☐ FAX By:

BNMS@HMDQ BNCDR90—E f`kok1—14/1kok:
2—4//1kok:3—0KM`kfdmd:4—14/1kAF:
5—4//1kAF:6—0KAF:7—3/1kUN@:
8—5/1kUN@:0/—014 1kUN@:00—3 nyfk`mri`q:
01—7 nyfk`mri`q:02—aq`mstad:03—nsgdq
PRESERVATIVE CODES: a—HNO_3; b—HCl; c—H_2SO_4; d—$Na_2S_2O_3$; e—NaOH; f—$C_2H_3O_2Cl$; g—other

LAB ID	SAMPLE ID	DATE	TIME	MATRIX*	PRESERVATIVE	CONTAINER	ANALYSIS

SAMPLE CONDITION/SPECIAL INSTRUCTIONS

RELINQUISHED BY (Sign & Print)	DATE/TIME	RECEIVED BY (Sign)	DATE/TIME

SAMPLE DISPOSAL
☐ NCL Disposal of Non-Contaminated
☐ Return ☐ Pickup

CHAIN OF CUSTODY SEALS Y/N/NA
SHIPPED VIA: UPS Edc,Dw G`mc

***MATRIX:** DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; V V < V `rsdV `sdq:R< RnHk:N < N sgdq-

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

MIP Attachment 4: Field Meter Instructions

Section 6 References

California Stormwater Quality Association. (August 2014). *Stormwater BMP Handbook: Industrial Commercial.* Accessed at: www.casqa.org,

National Oceanographic and Atmospheric Administration. (NR). "Weather Forecasts." Accessed at: http://www.srh.noaa.gov/.

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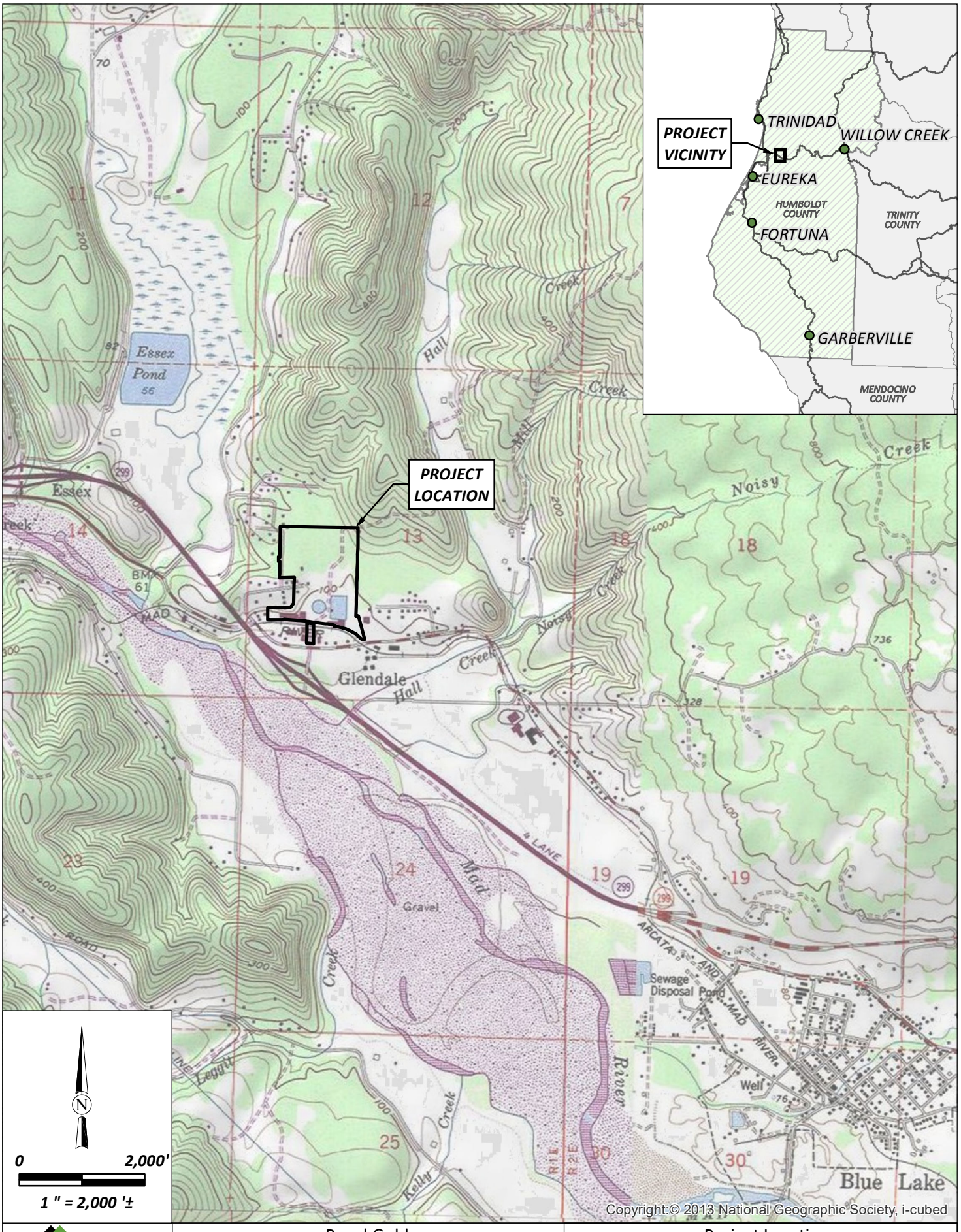
State Water Resources Control Board. (2014). "Order 2014-0057-DWQ, NPDES General Permit No. CAS000001: National Pollutant Discharges Elimination System (NPDES) California General Permit for Stormwater Discharge Associated with Industrial Activities." Accessed at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/industrial.shtml.

---. (2016) ArcGIS Industrial Storm Water Map. Accessed November 3, 2016 at: http://www.arcgis.com/home/webmap/viewer.html?webmap=0d5a1593ced644658206debd338ee6f8&extent=-124.4982,29.0016,-115.006,43.5909.

Appendix A: Site Maps



N

0 2,000'

1 " = 2,000 '±

Path: \\Arcata\Projects\2016\016098A-Royal-Gold\GIS\Figures\SWPPP\SWPA5\SWPA5_Fig1_ProjectLocation.mxd User Name: jsousa DATE: 4/8/21, 3:13 PM

SHN	Royal Gold SWPPP Glendale, Humboldt County, California	Project Location SHN 016098.002
	April 2021 | SWPA5_Fig1_ProjectLocation	Figure 1

EXPLANATION

- DISCHARGE LOCATION
- BIO GABIONS
- VEGETATED GRAVEL BERM
- STORMWATER CONVEYANCE
- DRAINAGE FLOW PATH
- BIOSWALE
- CURB
- CHECK DAM
- FILTREXX SOXX
- FIBER ROLL
- SILT FENCE
- GRAVEL BERM
- SEDIMENT POND
- SEDIMENT TRAP
- DRAINAGE INLET
- DOWNSPOUT FILTER
- PROJECT SITE BOUNDARY
- IMPERVIOUS AREA
- STORM RESISTANT SHELTER
- DUST SCREEN
- ECOBLOCK WALL
- DRAINAGE MANAGEMENT AREA
- 1 DRAINAGE MANAGEMENT AREA ID

1 OFFICE
2 RAW/FINISHED PRODUCT - PALLETIZED, SEALED & COVERED
3 LOADING/UNLOADING AREA
4 GRINDER/COCO HYDRATION BUILDING
5 ENCLOSED COMPOST STORAGE
6 MAINTENANCE SHOP
7 FINISHED COCO STORAGE
8 WATER TANK
9 EMPLOYEE PARKING
10 SAW DUST STOCKPILE
11 BULK TOTE PAD
12 COCO PROCESS WATER, LINED POND
13 COCO SQUEEZER
14 BULK YARD
15 PAVED FOREST HUMUS AREA
16 SEDIMENT TRAP
17 BAGGING LINE (AMENDMENTS IN DUST HUT)
18 HYDRATION WATER CONVEYANCE SYSTEM TO SANITARY SEWER
19 AMENDMENT STORAGE (SEALED & PALETIZED)
20 SPILL KIT
21 FUELING AREA
22 GUTTER INTERCEPTOR
23 TRUCK/VEHICLE/EQUIPMENT STORAGE
24 WASTE DISPOSAL AREA
25 FLOATING TREATMENT ISLANDS (FTI)
26 PROCESSED WATER TANKS (SEE 18)
27 WASTE SOIL PILE
28 CHIP BIN
29 BREAK-DOWN BIN
30 PEAT BARN
31 MAIN ENTRANCE

0 200'
1 " = 200 '±

RINSE STATION
BIOSWALE
SCREENER
BIOSWALE
VEGETATED GEOTEXTILE FABRIC LINED DITCH W/ FLOATING TREATMENT ISLAND, GRAVEL BAG BERMS, OIL BOOM & FIBER MEDIA SOCK
BARN
CONCRETE SEDIMENT TRAP W/ GRAVEL BAG CHECK DAMS & FIBER MEDIA SOCK, WITH 1 FTI
CONCRETE SWALE W/ GRAVEL BAG CHECK DAMS & FIBER MEDIA SOCK
TRUCK EXIT
DUMPSTER
TRUCK EXIT
GLENDALE DRIVE

*DISCHARGE LOCATIONS 2, 3, & 5 ARE POLYPROPYLENE LINED DITCH W/ GRAVEL BAG CHECK DAMS & FIBER MEDIA SOCKS

IMAGE SOURCE: GOOGLE EARTH, 2019

NOTES: SUB SURFACE STORMWATER CONVEYANCE SYSTEMS ARE DRAWN AS ESTIMATED LOCATIONS
FEATURES DRAWN SUCH AS CHECK DAMS ARE REPRESENTATIONS AND DO NOT ILLUSTRATE ACTUAL QUANTITY

Path: \\Arcata\Projects\2016\016098A-Royal-Gold\GIS\Figures\SWPPP\SWPA5\SWPA5_Fig2_BMPLocationMap.mxd User Name: jsousa DATE: 6/30/21, 1:38PM

Royal Gold SWPPP Glendale, Humboldt County, California	BMP Location Map SHN 016098.002	
June 2021	SWPA5_Fig2_BMPLocationMap	Figure 2

Appendix B: Permit Registration Documents

Permit Registration Documents included in this Appendix

Y/N	Permit Registration Document
Y	Notice of Intent
Y	Certification
Y	Copy of Annual Fee Receipt
Y	Site Maps, see Appendix A

CALIFORNIA Water Boards

State Water Resources Control Board

NOTICE OF INTENT

GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH INDUSTRIAL ACTIVITY (WQ ORDER No. 2014-0057-DWQ)
(Excluding Construction Activities)

GAVIN NEWSOM
GOVERNOR

JARED BLUMENFELD
SECRETARY FOR
ENVIRONMENTAL PROTECTION

WDID: 1 12I025790 Status: Active

Operator Information

Type: Private Business

Name: Chad Waters
Address: 1689 Glendale Drive
Address 2:
City/State/Zip: Arcata CA 95521
Federal Tax ID:

Contact Name: Chad Waters
Title: Owner
Phone Number: 707-822-4853
Email Address: ericfreergc@gmail.com

Facility Information

Level:

Contact Name: Eric Free
Site Name: Royal Gold LLC
Address: 1689 Glendale Drive
City/State/Zip: Arcata CA 95521
County: Humboldt
Latitude: 40.900839 Longitude: -124.022139

Title: Office Manager
Site Phone #: 707-822-4653
Email Address: ericfreergc@gmail.com
Site Size: 28.55 Acres
Industrial Area Exposed to Storm Water: 15.5 Acres
Percent of Site Impervious (Including Rooftops): 82 %

SIC Code Information

1. 2875 Fertilizers, Mixing Only
2.
3.

Additional Information

Receiving Water: Mill Creek
Flow: Indirectly
Storm Drain System:
Compliance Group: North State Soil Mixers

RWQCB Jurisdiction: Region 1 - North Coast
Phone: 707-576-2220
Email: r1_stormwater@waterboards.ca.gov

Certification

Name: Chad Waters
Date: August 11, 2015
Title: Owner

May 12, 2021

Chad Waters
Chad Waters
1689 Glendale Drive
Arcata, CA 95521

Facility Info: Royal Gold LLC
1689 Glendale Drive
Arcata, CA 95521
SIC Code(s): 2875

Waste Discharge Identification Number: 1 12I025790

Date Processed: July 07, 2015

RECEIPT OF YOUR NOTICE OF INTENT (NOI)

The State Water Resources Control Board (State Water Board) received and processed the NOI to comply with the terms of the General Permit for Storm Water Discharges Associated with Industrial Activity Order 2014-0057-DWQ.

Waste Discharger Identification (WDID) number 1 12I025790 is assigned to the facility referenced above.

Accordingly, you are required to comply with all applicable permit requirements.

Notice of Termination (NOT) is required to be submitted to the State Water Board should the owner or operator of the facility change or upon closure of the facility. Until an NOT is submitted you will continue and are responsible to pay the annual fee invoiced each July.

If you have any further questions, please contact your local Regional Water Board at 707-576-2220.

Please visit the storm water web page at www.waterboards.ca.gov/water_issues/programs/stormwater/industrial.shtml for storm water related information.

Sincerely,
Storm Water Program
Division of Water Quality

Appendix C: Training Reporting Form

Trained Team Member Log
Stormwater Management Training Log and Documentation

Facility Name: Royal Gold LLC

WDID #: 1 12I025790

Stormwater Management Topic: (check as appropriate)

- ☐ Good Housekeeping
- ☐ Spill and Leak Prevention and Response
- ☐ Erosion and Sediment Controls
- ☐ Advanced BMPs
- ☐ Stormwater Sampling and Analysis
- ☐ Preventative Maintenance
- ☐ Material Handling and Waste Management
- ☐ Quality Assurance and Record Keeping
- ☐ Visual Monitoring

Specific Training Objective: _____

_____

Location: _____ Date: _____

Instructor: _____ Telephone: _____

Course Length (min/hrs): _____

Attendee Roster (Attach additional forms if necessary)

Name	Company	Phone

As needed, add proof of external training (e.g., course completion certificates, credentials for QISP).

Appendix D: SWPPP Amendment Certifications

SWPPP Amendment No. 3 - Level 1 ERA Report

Project Name: **Royal Gold LLC**

WDID Number: **1 12I025790**

Legally Responsible Person's Certification of the
Stormwater Pollution Prevention Plan Amendment

This Stormwater Pollution Prevention Plan and attachments were prepared under my direction to meet the requirements of the California Industrial General Permit (SWRCB Order No. 2014-0057-DWQ).

Chad Waters	12/30/16
LRP's Signature	Date
Chad Waters	Owner
LRP Name	LRP Title
Owner	(707) 362-3616
Title and Affiliation	Telephone
600 F street ste 3 #603 Arcata, CA 95521	chadrgc@gmail.com
Address	Email

SWPPP Amendment No. 2 - SWPPP Revision & Site Map

Project Name: **Royal Gold LLC**

WDID Number: **1 12I025790**

Legally Responsible Person's Certification of the
Stormwater Pollution Prevention Plan Amendment

This Stormwater Pollution Prevention Plan and attachments were prepared under my direction to meet the requirements of the California Industrial General Permit (SWRCB Order No. 2014-0057-DWQ).

Chad Waters	12/30/16
LRP's Signature	Date
Chad Waters	Owner
LRP Name	LRP Title
Owner	(707) 362-3616
Title and Affiliation	Telephone
600 F Street Ste 3 #603 Arcata, CA 95521	chadrgc@gmail.com
Address	Email

SWPPP Amendment No. 1 – Pollutant Source Amendment

Project Name: **Royal Gold LLC**

WDID Number: **1 12I025790**

Legally Responsible Person's Certification of the
Stormwater Pollution Prevention Plan Amendment

This Stormwater Pollution Prevention Plan and attachments were prepared under my direction to meet the requirements of the California Industrial General Permit (SWRCB Order No. 2014-0057-DWQ).

Chad Waters	12/30/16
LRP's Signature	Date
Chad Waters	Owner
LRP Name	LRP Title
Owner	(707) 362-3616
Title and Affiliation	Telephone
600 F Street Ste 3 #603 Arcata, CA 95521	chadrgc@gmail.com
Address	Email

SWPPP Amendment No. 4

Project Name: Royal Gold LLC

Project Number: 1 12I025790

Legally Responsible Person's Certification of the
Stormwater Pollution Prevention Plan Amendment

This Stormwater Pollution Prevention Plan and attachments were prepared under my direction to meet the requirements of the California Industrial General Permit (SWRCB Order No. 2014-0057-DWQ).

Chad Waters	9/27/17
LRP's Signature	Date
Chad Waters	Owner
LRP Name	LRP Title
Owner	(707) 362-3616
Title and Affiliation	Telephone
600 F Street ste 3 # 603 Arcata, CA 95521	chadrgc@gmail.com
Address	Email

SWPPP Amendment No. 5

Project Name: Royal Gold LLC

Project Number: 1 12I025790

Legally Responsible Person's Certification of the Stormwater Pollution Prevention Plan Amendment

This stormwater pollution prevention plan and attachments were prepared under my direction to meet the requirements of the California Industrial General Permit (SWRCB Order No. 2014-0057-DWQ).

Chad Waters
LRP's Signature

7/01/2021
Date

Chad Waters
LRP Name

OWNER
LRP Title

CEO
Title and Affiliation

(707)362-3616
Telephone

11689 Glendale Dr. McKinleyville, CA 95519
Address

Chad@royalgoldcoco.com
Email

SWPPP Amendment No. _____

Project Name: _____

Project Number: _____

Legally Responsible Person's Certification of the Stormwater Pollution Prevention Plan Amendment

This stormwater pollution prevention plan and attachments were prepared under my direction to meet the requirements of the California Industrial General Permit (SWRCB Order No. 2014-0057-DWQ).

LRP's Signature	Date
LRP Name	LRP Title
Title and Affiliation	Telephone
Address	Email

Appendix E: CASQA Stormwater BMP Handbook: Industrial and Commercial Fact Sheets

The following BMP fact sheets are available from the CASQA Construction Portal, with the exception of the source control (SC) and treatment control (TC) BMPs found in the Industrial Portal, for a subscription. Additional sources of BMP fact sheet sources include:

2003 Caltrans Construction Site BMP Manual available at:
http://www.dot.ca.gov/hq/construc/stormwater/CSBMPM_303_Final.pdf

U.S. E.P.A. National Menu of BMPs available at:
http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse

one of the most useful and updated sources in the Caltrans Erosion Control Toolbox at:
http://www.dot.ca.gov/hq/LandArch/ec/index.htm

National Menu of Stormwater Best Management Practices @
http://water.epa.gov/polwaste/npdes/swbmp/

Caltrans Construction Site BMP Fact Sheets @
http://www.dot.ca.gov/hq/construc/stormwater/factsheets.htm

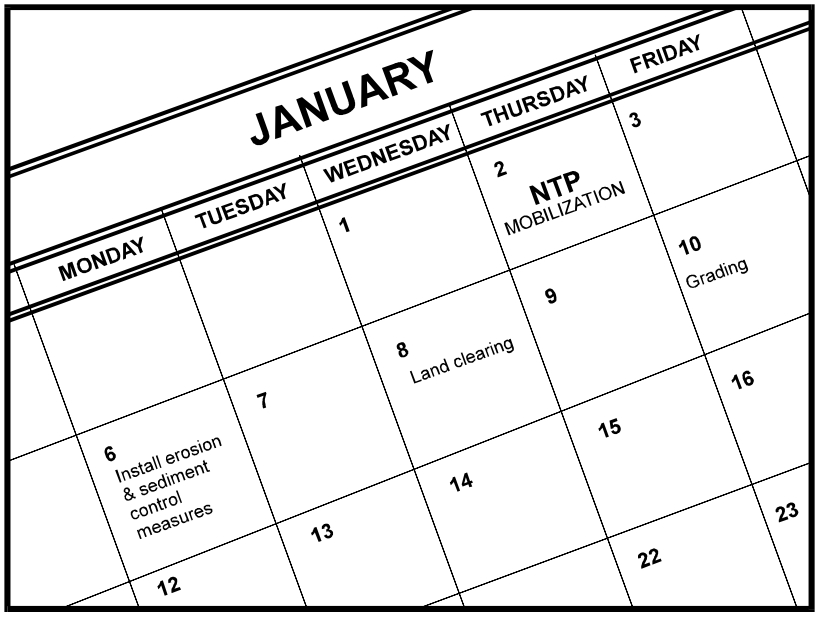
Oregon DEQ Industrial Stormwater BMP Manual @
http://www.deq.state.or.us/wq/wqpermit/docs/IndBMP021413.pdf

Sacramento County Industrial Stormwater BMP Manual @
http://www.waterresources.saccounty.net/stormwater/documents/industrial-BMP-manual.pdf

Minnesota Industrial Stormwater BMP Manual @
http://www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/stormwater-management/stormwater-best-management-practices-manual.html

*CASQA Stormwater BMP Handbook Fact Sheet hard copies are kept onsite.

Scheduling EC-1



Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase of construction. Clearly show how the rainy season relates

Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

Inspection and Maintenance

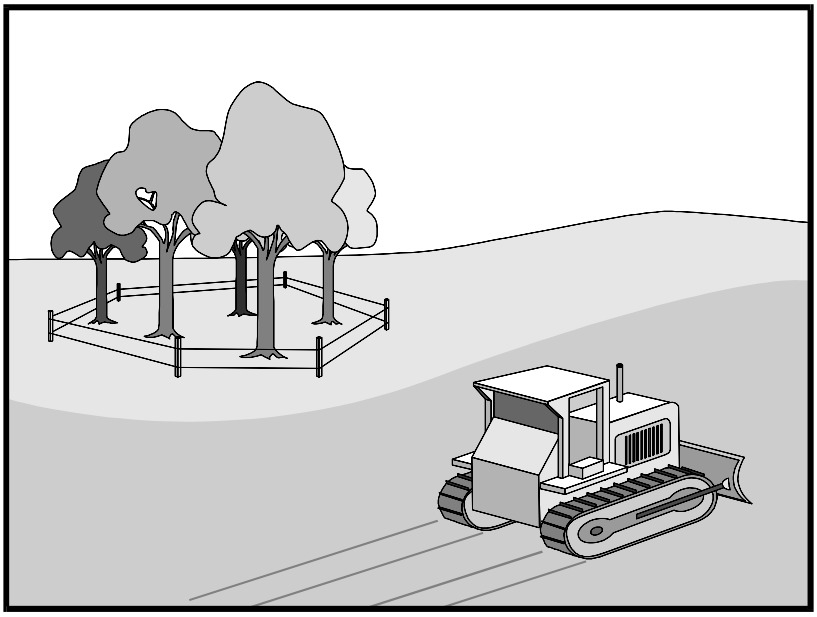
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

Preservation Of Existing Vegetation EC-2



Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Preservation Of Existing Vegetation EC-2

Limitations

- Requires forward planning by the owner/developer, contractor, and design staff.
- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

Timing

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

Costs

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree.

Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
  - Fertilize stressed or damaged broadleaf trees to aid recovery.
  - Fertilize trees in the late fall or early spring.

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.

- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

References

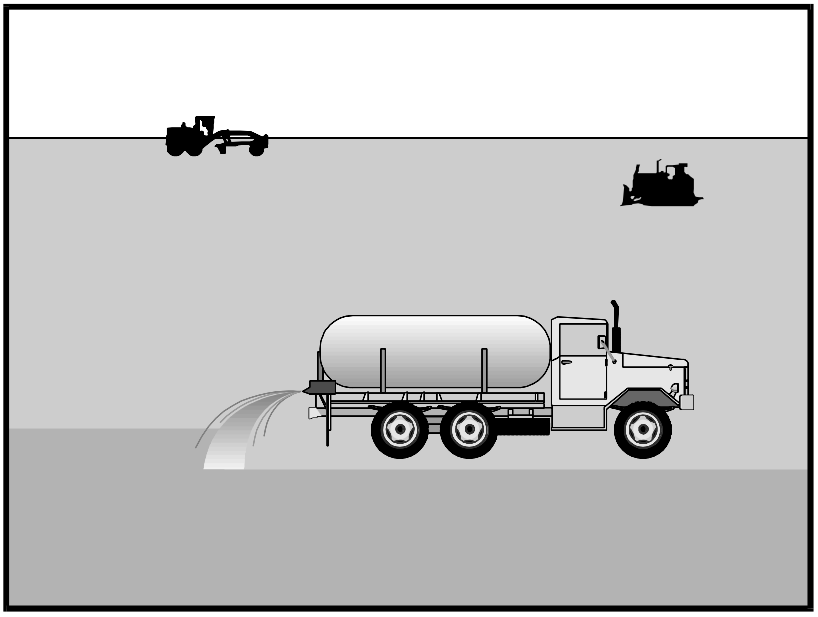
County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Soil Binders EC-5



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch
EC-4 Hydroseeding
EC-6 Straw Mulch
EC-7 Geotextiles and Mats
EC-8 Wood Mulching

Description and Purpose

Soil binding consists of application and maintenance of a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water and wind induced erosion of exposed soils on construction sites.

Suitable Applications

Soil binders are typically applied to disturbed areas requiring temporary protection. Because soil binders, when used as a stand-alone practice, can often be incorporated into the soil, they are a good alternative to mulches in areas where grading activities will soon resume. Soil binders are commonly used in the following areas:

- Rough graded soils that will be inactive for a short period of time
- Soil stockpiles
- Temporary haul roads prior to placement of crushed rock
- Compacted soil road base
- Construction staging, materials storage, and layout areas

Limitations

- Soil binders are temporary in nature and may need reapplication.
- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer. Curing time

may be 24 hours or longer. Soil binders may need reapplication after a storm event.

- Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.
- Plant-material-based soil binders do not generally hold up to pedestrian or vehicular traffic across treated areas as well as polymeric emulsion blends or cementitious-based binders.
- Soil binders may not sufficiently penetrate compacted soils.
- Some soil binders are soil texture specific in terms of their effectiveness. For example, polyacrylamides (PAMs) work very well on silt and clayey soils but their performance decreases dramatically in sandy soils.
- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil.
- Soil binders may not cure if low temperatures occur within 24 hours of application.
- The water quality impacts of some chemical soil binders are relatively unknown and some may have water quality impacts due to their chemical makeup. Additionally, these chemical may require non-visible pollutant monitoring. Products should be evaluated for project-specific implementation by the SWPPP Preparer. Refer to the product Material Safety Data Sheet for chemical properties.

Implementation

General Considerations

- Soil binders should conform to local municipality specifications and requirements.
- Site soil types will dictate appropriate soil binders to be used.
- A soil binder must be environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and should not stain paved or painted surfaces. Soil binders should not pollute stormwater when cured. Obtain a Material Safety Data Sheet (MSDS) from the manufacturer to ensure non-toxicity.
- Stormwater runoff from PAM treated soils should pass through one of the following sediment control BMP prior to discharging to surface waters.
    - When the total drainage area is greater than or equal to 5 acres, PAM treated areas should drain to a sediment basin.
    - Areas less than 5 acres should drain to sediment control BMPs, such as a sediment trap, or a series of check dams. The total number of check dams used should be maximized to achieve the greatest amount of settlement of sediment prior to discharging from the site. Each check dam should be spaced evenly in the drainage channel through which stormwater flows are discharged off site.

- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Selecting a Soil Binder

Properties of common soil binders used for erosion control are provided on Table 1 at the end of this Fact Sheet. Use Table 1 to select an appropriate soil binder. Refer to WE-1, Wind Erosion Control, for dust control soil binders.

Factors to consider when selecting a soil binder include the following:

- Suitability to situation - Consider where the soil binder will be applied, if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time soil stabilization will be needed, and if the soil binder will be placed in an area where it will degrade rapidly. In general, slope steepness is not a discriminating factor for the listed soil binders.
- Soil types and surface materials - Fines and moisture content are key properties of surface materials. Consider a soil binder's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials.
- Frequency of application - The frequency of application is related to the functional longevity of the binder, which can be affected by subgrade conditions, surface type, climate, and maintenance schedule.
- Frequent applications could lead to high costs. Application frequency may be minimized if the soil binder has good penetration, low evaporation, and good longevity. Consider also that frequent application will require frequent equipment clean up.

Plant-Material-Based (Short Lived, <6 months) Binders

Guar: Guar is a non-toxic, biodegradable, natural galactomannan-based hydrocolloid treated with dispersant agents for easy field mixing. It should be mixed with water at the rate of 11 to 15 lb per 1,000 gallons. Recommended minimum application rates are as follows:

Application Rates for Guar Soil Stabilizer

Slope (H:V):	Flat	4:1	3:1	2:1	1:1
lb/acre:	40	45	50	60	70

Psyllium: Psyllium is composed of the finely ground muciloid coating of plantago seeds that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but rewettable membrane that binds soil particles together, but permits germination and growth of seed. Psyllium requires 12 to 18 hours drying time. Application rates should be from 80 to 200 lb/acre, with enough water in solution to allow for a uniform slurry flow.

Starch: Starch is non-ionic, cold water soluble (pre-gelatinized) granular cornstarch. The material is mixed with water and applied at the rate of 150 lb/acre. Approximate drying time is 9 to 12 hours.

Plant-Material-Based (Long Lived, 6-12 months) Binders

Pitch and Rosin Emulsion: Generally, a non-ionic pitch and rosin emulsion has a minimum solids content of 48%. The rosin should be a minimum of 26% of the total solids content. The soil stabilizer should be non-corrosive, water dilutable emulsion that upon application cures to a water insoluble binding and cementing agent. For soil erosion control applications, the emulsion is diluted and should be applied as follows:

- For clayey soil: 5 parts water to 1 part emulsion
- For sandy soil: 10 parts water to 1 part emulsion

Application can be by water truck or hydraulic seeder with the emulsion and product mixture applied at the rate specified by the manufacturer.

Polymeric Emulsion Blend Binders

Acrylic Copolymers and Polymers: Polymeric soil stabilizers should consist of a liquid or solid polymer or copolymer with an acrylic base that contains a minimum of 55% solids. The polymeric compound should be handled and mixed in a manner that will not cause foaming or should contain an anti-foaming agent. The polymeric emulsion should not exceed its shelf life or expiration date; manufacturers should provide the expiration date. Polymeric soil stabilizer should be readily miscible in water, non-injurious to seed or animal life, non-flammable, should provide surface soil stabilization for various soil types without totally inhibiting water infiltration, and should not re-emulsify when cured. The applied compound typically requires 12 to 24 hours drying time. Liquid copolymer should be diluted at a rate of 10 parts water to 1 part polymer and the mixture applied to soil at a rate of 1,175 gallons/acre.

Liquid Polymers of Methacrylates and Acrylates: This material consists of a tackifier/sealer that is a liquid polymer of methacrylates and acrylates. It is an aqueous 100% acrylic emulsion blend of 40% solids by volume that is free from styrene, acetate, vinyl, ethoxylated surfactants or silicates. For soil stabilization applications, it is diluted with water in accordance with the manufacturer's recommendations, and applied with a hydraulic seeder at the rate of 20 gallons/acre. Drying time is 12 to 18 hours after application.

Copolymers of Sodium Acrylates and Acrylamides: These materials are non-toxic, dry powders that are copolymers of sodium acrylate and acrylamide. They are mixed with water and applied to the soil surface for erosion control at rates that are determined by slope gradient:

Slope Gradient (H:V)	lb/acre
Flat to 5:1	3.0 – 5.0
5:1 to 3:1	5.0 – 10.0
2:1 to 1:1	10.0 – 20.0

Poly-Acrylamide (PAM) and Copolymer of Acrylamide**:** Linear copolymer polyacrylamide for use as a soil binder is packaged as a dry flowable solid, as a liquid. Refer to the manufacturer's recommendation for dilution and application rates as they vary based on liquid or dry form, site conditions and climate.

- Limitations specific to PAM are as follows:
  - Do not use PAM on a slope that flows into a water body without passing through a sediment trap or sediment basin.
  - The specific PAM copolymer formulation must be anionic. Cationic PAM should not be used in any application because of known aquatic toxicity problems. Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, should be used for soil applications.
  - PAM designated for erosion and sediment control should be "water soluble" or "linear" or "non-cross linked".
  - PAM should not be used as a stand-alone BMP to protect against water-based erosion. When combined with mulch, its effectiveness increases dramatically.

Hydro-Colloid Polymers: Hydro-Colloid Polymers are various combinations of dry flowable poly-acrylamides, copolymers and hydro-colloid polymers that are mixed with water and applied to the soil surface at rates of 55 to 60 lb/acre. Drying times are 0 to 4 hours.

Cementitious-Based Binders

Gypsum: This is a formulated gypsum based product that readily mixes with water and mulch to form a thin protective crust on the soil surface. It is composed of high purity gypsum that is ground, calcined and processed into calcium sulfate hemihydrate with a minimum purity of 86%. It is mixed in a hydraulic seeder and applied at rates 4,000 to 12,000 lb/acre. Drying time is 4 to 8 hours.

Applying Soil Binders

After selecting an appropriate soil binder, the untreated soil surface must be prepared before applying the soil binder. The untreated soil surface must contain sufficient moisture to assist the agent in achieving uniform distribution. In general, the following steps should be followed:

- Follow manufacturer's written recommendations for application rates, pre-wetting of application area, and cleaning of equipment after use.
- Prior to application, roughen embankment and fill areas.
- Consider the drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders should not be applied during or immediately before rainfall.
- Avoid over spray onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.

- Soil binders should not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the temperature is below 40°F during the curing period.
- More than one treatment is often necessary, although the second treatment may be diluted or have a lower application rate.
- Generally, soil binders require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer's instructions for specific cure time.
- For liquid agents:
  - Crown or slope ground to avoid ponding.
  - Uniformly pre-wet ground at 0.03 to 0.3 gal/yd^2 or according to manufacturer's recommendations.
  - Apply solution under pressure. Overlap solution 6 to 12 in.
  - Allow treated area to cure for the time recommended by the manufacturer; typically at least 24 hours.
  - Apply second treatment before first treatment becomes ineffective, using 50% application rate.
  - In low humidities, reactivate chemicals by re-wetting with water at 0.1 to 0.2 gal/yd^2.

Costs

Costs vary according to the soil stabilizer selected for implementation. The following are approximate installed costs:

Soil Binder	Cost per Acre (2004)[1]	Estimated Cost per Acre (2009)[2]
Plant-Material-Based (Short Lived) Binders	$700-$900	$770-$990
Plant-Material-Based (Long Lived) Binders	$1,200-$1,500	$1,320-$1,650
Polymeric Emulsion Blend Binders	$700 -$1,500	$770-$1,650
Cementitious-Based Binders	$800-$1,200	$880-$1,350

1. Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004).

2. 2009 costs reflect a 10% escalation over year 2004 costs. Escalation based on informal survey of industry trends. Note: Expected cost increase is offset by competitive economic conditions.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Reapply the selected soil binder as needed to maintain effectiveness.

Table 1 Properties of Soil Binders for Erosion Control

Evaluation Criteria	Binder Type			
	Plant Material Based (Short Lived)	**Plant Material Based (Long Lived)**	**Polymeric Emulsion Blends**	**Cementitious-Based Binders**
Relative Cost	Low	Moderate to High	Low to High	Low to Moderate
Resistance to Leaching	High	High	Low to Moderate	Moderate
Resistance to Abrasion	Moderate	Low	Moderate to High	Moderate to High
Longevity	Short to Medium	Medium	Medium to Long	Medium
Minimum Curing Time before Rain	9 to 18 hours	19 to 24 hours	0 to 24 hours	4 to 8 hours
Compatibility with Existing Vegetation	Good	Poor	Poor	Poor
Mode of Degradation	Biodegradable	Biodegradable	Photodegradable/ Chemically Degradable	Photodegradable/ Chemically Degradable
Labor Intensive	No	No	No	No
Specialized Application Equipment	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher
Liquid/Powder	Powder	Liquid	Liquid/Powder	Powder
Surface Crusting	Yes, but dissolves on rewetting	Yes	Yes, but dissolves on rewetting	Yes
Clean Up	Water	Water	Water	Water
Erosion Control Application Rate	Varies (1)	Varies (1)	Varies (1)	4,000 to 12,000 lbs/acre

(1) See Implementation for specific rates.

References

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

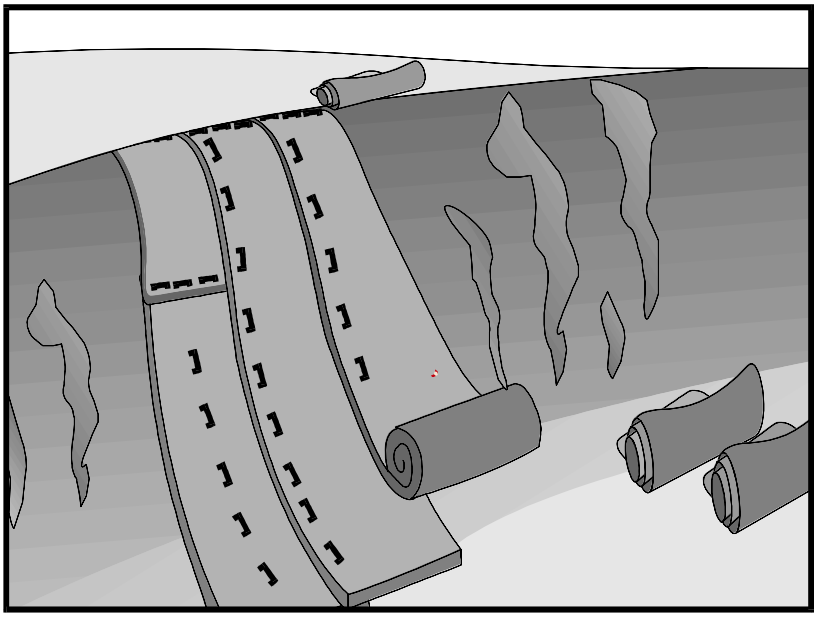
Sedimentation and Erosion Control, An Inventory of Current Practices Draft, US EPA, April 1990.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Geotextiles and Mats EC-7



Categories		
EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

Description and Purpose

Mattings, or Rolled Erosion Control Products (RECPs), can be made of natural or synthetic materials or a combination of the two. RECPs are used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. Additionally, RECPs may be used to stabilize soils until vegetation is established or to reinforce non-woody surface vegetation.

Suitable Applications

RECPs are typically applied on slopes where erosion hazard is high and vegetation will be slow to establish. Mattings are also used on stream banks, swales and other drainage channels where moving water at velocities between 3 ft/s and 6 ft/s are likely to cause scour and wash out new vegetation, and in areas where the soil surface is disturbed and where existing vegetation has been removed. RECPs may also be used when seeding cannot occur (e.g., late season construction and/or the arrival of an early rain season). RECPs should be considered when the soils are fine grained and potentially erosive. RECPs should be considered in the following situations.

- Steep slopes, generally steeper than 3:1 (H:V)
- Slopes where the erosion potential is high
- Slopes and disturbed soils where mulch must be anchored
- Disturbed areas where plants are slow to develop

- Channels with flows exceeding 3.3 ft/s
- Channels to be vegetated
- Stockpiles
- Slopes adjacent to water bodies

Limitations

- RECP installed costs are generally higher than other erosion control BMPs, limiting their use to areas where other BMPs are ineffective (e.g. channels, steep slopes).
- RECPs may delay seed germination, due to reduction in soil temperature.
- RECPs are generally not suitable for excessively rocky sites or areas where the final vegetation will be mowed (since staples and netting can catch in mowers). If a staple or pin cannot be driven into the soil because the underlying soil is too hard or rocky, then an alternative BMP should be selected.
- If used for temporary erosion control, RECPs should be removed and disposed of prior to application of permanent soil stabilization measures.
- The use of plastic should be limited to covering stockpiles or very small graded areas for short periods of time (such as through one imminent storm event) until more environmentally friendly measures, such as seeding and mulching, may be installed.
    - Plastic sheeting is easily vandalized, easily torn, photodegradable, and must be disposed of at a landfill.
    - Plastic sheeting results in 100% runoff, which may cause serious erosion problems in the areas receiving the increased flow.
- RECPs may have limitations based on soil type, slope gradient, or channel flow rate; consult the manufacturer for proper selection.
- Not suitable for areas that have foot traffic (tripping hazard) – e.g., pad areas around buildings under construction.
- RECPs that incorporate a plastic netting (e.g. straw blanket typically uses a plastic netting to hold the straw in place) may not be suitable near known wildlife habitat. Wildlife can become trapped in the plastic netting.
- RECPs may have limitations in extremely windy climates. However, when RECPs are properly trenched at the top and bottom and stapled in accordance with the manufacturer's recommendations, problems with wind can be minimized.

Implementation

Material Selection

- Natural RECPs have been found to be effective where re-vegetation will be provided by re-seeding. The choice of material should be based on the size of area, side slopes, surface conditions such as hardness, moisture, weed growth, and availability of materials.

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

- The following natural and synthetic RECPs are commonly used:

Geotextiles

- Material can be a woven or a non-woven polypropylene fabric with minimum thickness of 0.06 in., minimum width of 12 ft and should have minimum tensile strength of 150 lbs (warp), 80 lbs (fill) in conformance with the requirements in ASTM Designation: D 4632. The permittivity of the fabric should be approximately 0.07 sec^{-1} in conformance with the requirements in ASTM Designation: D4491. The fabric should have an ultraviolet (UV) stability of 70 percent in conformance with the requirements in ASTM designation: D4355. Geotextile blankets must be secured in place with wire staples or sandbags and by keying into tops of slopes to prevent infiltration of surface waters under geotextile. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Geotextiles may be reused if they are suitable for the use intended.

Plastic Covers

- Generally plastic sheeting should only be used as stockpile covering or for very small graded areas for short periods of time (such as through one imminent storm event). If plastic sheeting must be used, choose a plastic that will withstand photo degradation.

- Plastic sheeting should have a minimum thickness of 6 mils, and must be keyed in at the top of slope (when used as a temporary slope protection) and firmly held in place with sandbags or other weights placed no more than 10 ft apart. Seams are typically taped or weighted down their entire length, and there should be at least a 12 in. to 24 in. overlap of all seams. Edges should be embedded a minimum of 6 in. in soil (when used as a temporary slope protection).

- All sheeting must be inspected periodically after installation and after significant rainstorms to check for erosion, undermining, and anchorage failure. Any failures must be repaired immediately. If washout or breakages occur, the material should be re-installed after repairing the damage to the slope.

Erosion Control Blankets/Mats

- Biodegradable RECPs are typically composed of jute fibers, curled wood fibers, straw, coconut fiber, or a combination of these materials. In order for an RECP to be considered 100% biodegradable, the netting, sewing or adhesive system that holds the biodegradable mulch fibers together must also be biodegradable. See typical installation details at the end of this fact sheet.

- **Jute** is a natural fiber that is made into a yarn that is loosely woven into a biodegradable mesh. The performance of jute as a stand-alone RECP is low. Most other RECPs outperform jute as a temporary erosion control product and therefore jute is not commonly used. It is designed to be used in conjunction with vegetation. The material is supplied in rolled strips, which should be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Excelsior** (curled wood fiber) blanket material should consist of machine produced mats of curled wood excelsior with 80 percent of the fiber 6 in. or longer. The excelsior blanket should be of consistent thickness. The wood fiber must be evenly distributed over the entire area of the blanket. The top surface of the blanket should be covered with a photodegradable extruded plastic mesh. The blanket should be smolder resistant without the use of chemical additives and should be non-toxic and non-injurious to plant and animal life. Excelsior blankets should be furnished in rolled strips, a minimum of 48 in. wide, and should have an average weight of 0.8 lb/yd^2, ±10 percent, at the time of manufacture. Excelsior blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- **Straw blanket** should be machine produced mats of straw with a lightweight biodegradable netting top layer. The straw should be attached to the netting with biodegradable thread or glue strips. The straw blanket should be of consistent thickness. The straw should be evenly distributed over the entire area of the blanket. Straw blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- **Wood fiber blanket** is composed of biodegradable fiber mulch with extruded plastic netting held together with adhesives. The material is designed to enhance re-vegetation. The material is furnished in rolled strips, which must be secured to the ground with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Coconut fiber blanket** should be a machine produced mat of 100 percent coconut fiber with biodegradable netting on the top and bottom. The coconut fiber should be attached to the netting with biodegradable thread or glue strips. The coconut fiber blanket should be of consistent thickness. The coconut fiber should be evenly distributed over the entire area of the blanket. Coconut fiber blanket should be furnished in rolled strips with a minimum of 6.5 ft wide, a minimum of 80 ft. long and a minimum of 0.5 lb/yd^2. Coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- **Coconut fiber mesh** is a thin permeable membrane made from coconut or corn fiber that is spun into a yarn and woven into a biodegradable mat. It is designed to be used in conjunction with vegetation and typically has longevity of several years. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Straw coconut fiber blanket** should be machine produced mats of 70 percent straw and 30 percent coconut fiber with a biodegradable netting top layer and a biodegradable bottom net. The straw and coconut fiber should be attached to the netting with biodegradable thread or glue strips. The straw coconut fiber blanket should be of consistent thickness. The straw and coconut fiber should be evenly distributed over the entire area of the blanket. Straw coconut fiber blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Non-biodegradable RECPs are typically composed of polypropylene, polyethylene, nylon or other synthetic fibers. In some cases, a combination of biodegradable and synthetic fibers is used to construct the RECP. Netting used to hold these fibers together is typically non-biodegradable as well.

  - **Plastic netting** is a lightweight biaxially oriented netting designed for securing loose mulches like straw or paper to soil surfaces to establish vegetation. The netting is photodegradable. The netting is supplied in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Plastic mesh** is an open weave geotextile that is composed of an extruded synthetic fiber woven into a mesh with an opening size of less than ¼ in. It is used with re-vegetation or may be used to secure loose fiber such as straw to the ground. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Synthetic fiber with netting** is a mat that is composed of durable synthetic fibers treated to resist chemicals and ultraviolet light. The mat is a dense, three dimensional mesh of synthetic (typically polyolefin) fibers stitched between two polypropylene nets. The mats are designed to be re-vegetated and provide a permanent composite system of soil, roots, and geomatrix. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Bonded synthetic fibers** consist of a three dimensional geomatrix nylon (or other synthetic) matting. Typically it has more than 90 percent open area, which facilitates root growth. It's tough root reinforcing system anchors vegetation and protects against hydraulic lift and shear forces created by high volume discharges. It can be installed over prepared soil, followed by seeding into the mat. Once vegetated, it becomes an invisible composite system of soil, roots, and geomatrix. The material is furnished in rolled strips that must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Combination synthetic and biodegradable RECPs** consist of biodegradable fibers, such as wood fiber or coconut fiber, with a heavy polypropylene net stitched to the top and a high strength continuous filament geomatrix or net stitched to the bottom. The material is designed to enhance re-vegetation. The material is furnished in rolled strips,

which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Site Preparation

- Proper soil preparation is essential to ensure complete contact of the RECP with the soil. Soil Roughening is not recommended in areas where RECPs will be installed.
- Grade and shape the area of installation.
- Remove all rocks, clods, vegetation or other obstructions so that the installed blankets or mats will have complete, direct contact with the soil.
- Prepare seedbed by loosening 2 to 3 in. of topsoil.

Seeding/Planting

Seed the area before blanket installation for erosion control and re-vegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding prior to blanket installation, all areas disturbed during blanket installation must be re-seeded. Where soil filling is specified for turf reinforcement mats (TRMs), seed the matting and the entire disturbed area after installation and prior to filling the mat with soil.

Fertilize and seed in accordance with seeding specifications or other types of landscaping plans. The protective matting can be laid over areas where grass has been planted and the seedlings have emerged. Where vines or other ground covers are to be planted, lay the protective matting first and then plant through matting according to design of planting.

Check Slots

Check slots shall be installed as required by the manufacturer.

Laying and Securing Matting

- Before laying the matting, all check slots should be installed and the seedbed should be friable, made free from clods, rocks, and roots. The surface should be compacted and finished according to the requirements of the manufacturer's recommendations.
- Mechanical or manual lay down equipment should be capable of handling full rolls of fabric and laying the fabric smoothly without wrinkles or folds. The equipment should meet the fabric manufacturer's recommendations or equivalent standards.

Anchoring

- U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats and blankets to the ground surface.
- Wire staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.
- Metal stake pins should be 0.188 in. diameter steel with a 1.5 in. steel washer at the head of the pin, and 8 in. in length.
- Wire staples and metal stakes should be driven flush to the soil surface.

Installation on Slopes

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Begin at the top of the slope and anchor the blanket in a 6 in. deep by 6 in. wide trench. Backfill trench and tamp earth firmly.
- Unroll blanket down slope in the direction of water flow.
- Overlap the edges of adjacent parallel rolls 2 to 3 in. and staple every 3 ft (or greater, per manufacturer's specifications).
- When blankets must be spliced, place blankets end over end (shingle style) with 6 in. overlap. Staple through overlapped area, approximately 12 in. apart.
- Lay blankets loosely and maintain direct contact with the soil. Do not stretch.
- Staple blankets sufficiently to anchor blanket and maintain contact with the soil. Staples should be placed down the center and staggered with the staples placed along the edges. Steep slopes, 1:1 (H:V) to 2:1 (H:V), require a minimum of 2 staples/yd^2. Moderate slopes, 2:1 (H:V) to 3:1 (H:V), require a minimum of 1 ½ staples/yd^2. Check manufacturer's specifications to determine if a higher density staple pattern is required.

Installation in Channels

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Dig initial anchor trench 12 in. deep and 6 in. wide across the channel at the lower end of the project area.
- Excavate intermittent check slots, 6 in. deep and 6 in. wide across the channel at 25 to 30 ft intervals along the channels.
- Cut longitudinal channel anchor trenches 4 in. deep and 4 in. wide along each side of the installation to bury edges of matting, whenever possible extend matting 2 to 3 in. above the crest of the channel side slopes.
- Beginning at the downstream end and in the center of the channel, place the initial end of the first roll in the anchor trench and secure with fastening devices at 12 in. intervals. Note: matting will initially be upside down in anchor trench.
- In the same manner, position adjacent rolls in anchor trench, overlapping the preceding roll a minimum of 3 in.
- Secure these initial ends of mats with anchors at 12 in. intervals, backfill and compact soil.
- Unroll center strip of matting upstream. Stop at next check slot or terminal anchor trench. Unroll adjacent mats upstream in similar fashion, maintaining a 3 in. overlap.

- Fold and secure all rolls of matting snugly into all transverse check slots. Lay mat in the bottom of the slot then fold back against itself. Anchor through both layers of mat at 12 in. intervals, then backfill and compact soil. Continue rolling all mat widths upstream to the next check slot or terminal anchor trench.
- Alternate method for non-critical installations: Place two rows of anchors on 6 in. centers at 25 to 30 ft. intervals in lieu of excavated check slots.
- Staple shingled lap spliced ends a minimum of 12 in. apart on 12 in. intervals.
- Place edges of outside mats in previously excavated longitudinal slots; anchor using prescribed staple pattern, backfill, and compact soil.
- Anchor, fill, and compact upstream end of mat in a 12 in. by 6 in. terminal trench.
- Secure mat to ground surface using U-shaped wire staples, geotextile pins, or wooden stakes.
- Seed and fill turf reinforcement matting with soil, if specified.

Soil Filling (if specified for turf reinforcement mat (TRM))

Installation should be in accordance with the manufacturer's recommendations. Typical installation guidelines are as follows:

- After seeding, spread and lightly rake ½-3/4 inches of fine topsoil into the TRM apertures to completely fill TRM thickness. Use backside of rake or other flat implement.
- Alternatively, if allowed by product specifications, spread topsoil using lightweight loader, backhoe, or other power equipment. Avoid sharp turns with equipment.
- Always consult the manufacturer's recommendations for installation.
- Do not drive tracked or heavy equipment over mat.
- Avoid any traffic over matting if loose or wet soil conditions exist.
- Use shovels, rakes, or brooms for fine grading and touch up.
- Smooth out soil filling just exposing top netting of mat.

Temporary Soil Stabilization Removal

- Temporary soil stabilization removed from the site of the work must be disposed of if necessary.

Costs

Installed costs can be relatively high compared to other BMPs. Approximate costs for installed materials are shown below:

Rolled Erosion Control Products		Installed Cost per Acre (2004)[1]	Estimated Cost per Acre (2009)[2]
Biodegradable	Jute Mesh	$6,000-$7,000	$6,600-$7,700
	Curled Wood Fiber	$8,000-$10,500	$8,800-$11,050
	Straw	$8,000-$10,500	$8,800-$11,050
	Wood Fiber	$8,000-$10,500	$8,800-$11,050
	Coconut Fiber	$13,000-$14,000	$14,300-$15,400
	Coconut Fiber Mesh	$30,000-$33,000	$33,000-$36,300
	Straw Coconut Fiber	$10,000-$12,000	$11,000-$13,200
Non-Biodegradable	Plastic Netting	$2,000-$2,200	$2,200-$2,220
	Plastic Mesh	$3,000-$3,500	$3,300-$3,850
	Synthetic Fiber with Netting	$34,000-$40,000	$37,400-$44,000
	Bonded Synthetic Fibers	$45,000-$55,000	$49,500-$60,500
	Combination with Biodegradable	$30,000-$36,000	$33,000-$39,600

1. Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004).

2. 2009 costs reflect a 10% escalation over year 2004 costs. Escalation based on informal survey of industry trends. Note: Expected cost increase is offset by competitive economic conditions.

Inspection and Maintenance

- RECPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident shall be repaired and BMPs reapplied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.
- If washout or breakage occurs, re-install the material after repairing the damage to the slope or channel.
- Make sure matting is uniformly in contact with the soil.
- Check that all the lap joints are secure.
- Check that staples are flush with the ground.

References

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

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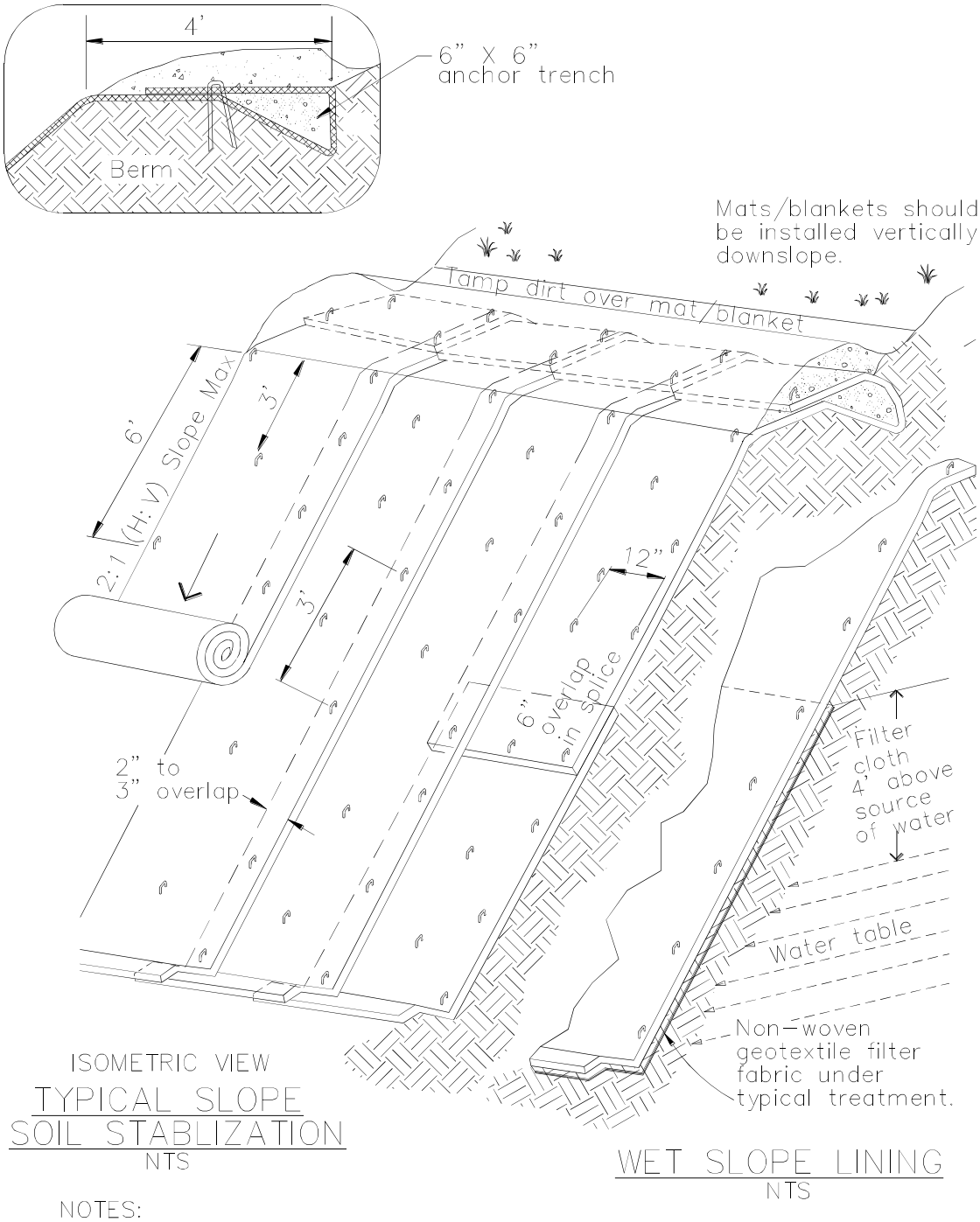


ISOMETRIC VIEW

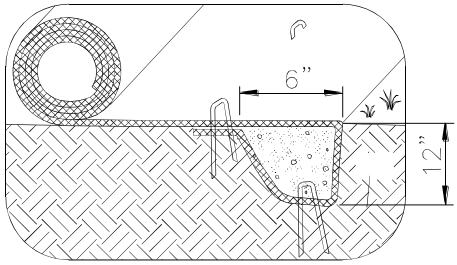
TYPICAL SLOPE
SOIL STABLIZATION
NTS

WET SLOPE LINING
NTS

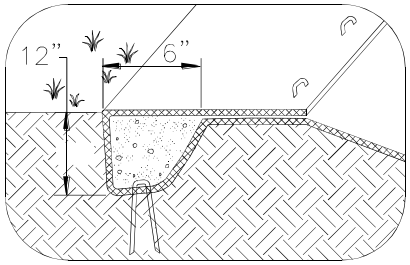
NOTES:

1. Slope surface shall be free of rocks, clods, sticks and grass. Mats/blankets shall have good soil contact.
2. Lay blankets loosely and stake or staple to maintain direct contact with the soil. Do not stretch.
3. Install per manufacturer's recommendations

TYPICAL INSTALLATION DETAIL



INITIAL CHANNEL ANCHOR TRENCH
NTS



TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH
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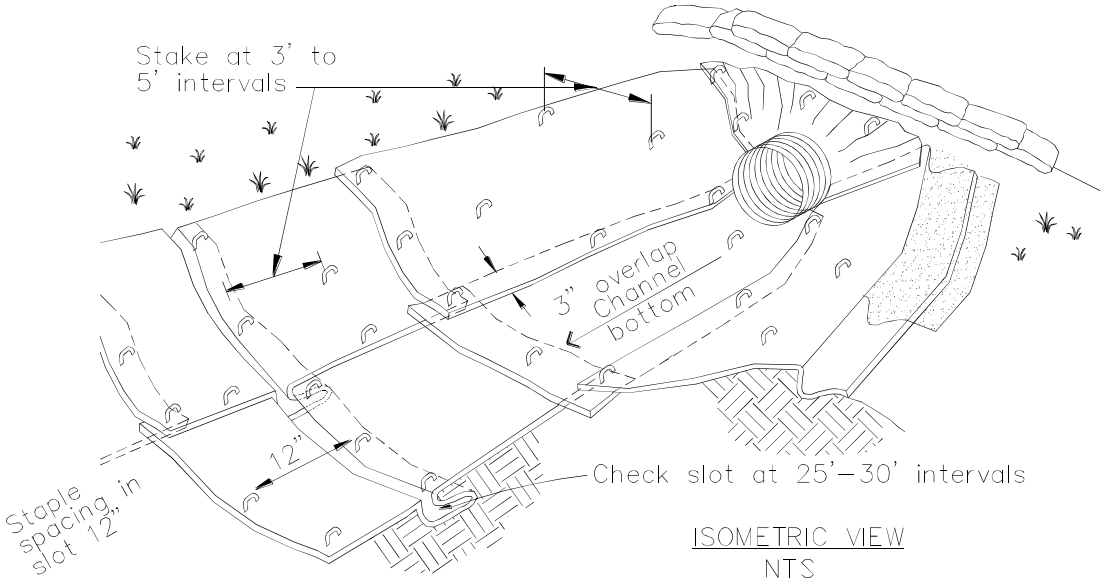
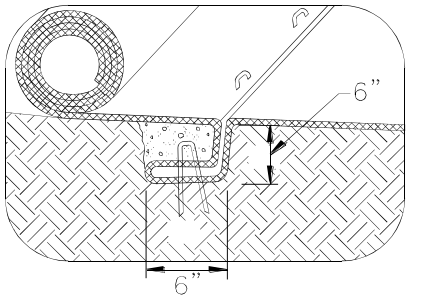
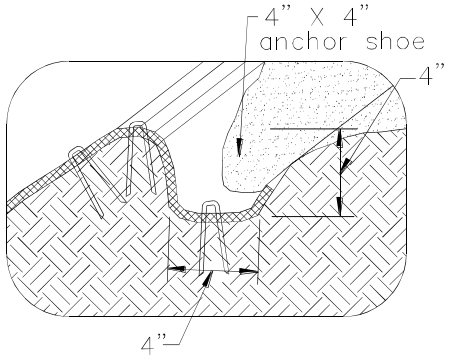


ISOMETRIC VIEW
NTS



INTERMITTENT CHECK SLOT
NTS



LONGITUDINAL ANCHOR TRENCH
NTS

NOTES:
1. Check slots to be constructed per manufacturers specifications.
2. Staking or stapling layout per manufacturers specifications.
3. Install per manufacturer's recommendations

TYPICAL INSTALLATION DETAIL

Wood Mulching EC-8

Description and Purpose

Wood mulching consists of applying a mixture of shredded wood mulch, bark or compost to disturbed soils. The primary function of wood mulching is to reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff.

Suitable Applications

Wood mulching is suitable for disturbed soil areas requiring temporary protection until permanent stabilization is established.

Limitations

- Not suitable for use on slopes steeper than 3:1 (H:V). Best suited to flat areas or gentle slopes or 5:1 (H:V) or flatter.
- Wood mulch and compost may introduce unwanted species.
- Not suitable for areas exposed to concentrated flows.
- May need to be removed prior to further earthwork.

Implementation

Mulch Selection

There are many types of mulches. Selection of the appropriate type of mulch should be based on the type of application, site conditions, and compatibility with planned or future uses.

Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

EC-5 Soil Binders

EC-6 Straw Mulch

EC-7 Geotextiles and Mats

Application Procedures

Prior to application, after existing vegetation has been removed, roughen embankment and fill areas by rolling with a device such as a punching type roller or by track walking. The construction application procedures for mulches vary significantly depending upon the type of mulching method specified. Two methods are highlighted here:

- Green Material: This type of mulch is produced by the recycling of vegetation trimmings such as grass, shredded shrubs, and trees. Methods of application are generally by hand although pneumatic methods are available.
  - Green material can be used as a temporary ground cover with or without seeding.
  - The green material should be evenly distributed on site to a depth of not more than 2 in.
- Shredded Wood: Suitable for ground cover in ornamental or revegetated plantings.
  - Shredded wood/bark is conditionally suitable. See note under limitations.
  - Distribute by hand or use pneumatic methods.
  - Evenly distribute the mulch across the soil surface to a depth of 2 to 3 in.
- Avoid mulch placement onto roads, sidewalks, drainage channels, existing vegetation, etc.

Costs

Average annual cost for installation and maintenance (3-4 months useful life) is around $4,000 per acre, but cost can increase if the source is not close to the project site.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident shall be repaired and BMPs reapplied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.
- Regardless of the mulching technique selected, the key consideration in inspection and maintenance is that the mulch needs to last long enough to achieve erosion control objectives. If the mulch is applied as a stand alone erosion control method over disturbed areas (without seed), it should last the length of time the site will remain barren or until final re-grading and revegetation.
- Where vegetation is not the ultimate cover, such as ornamental and landscape applications of bark or wood chips, inspection and maintenance should focus on longevity and integrity of the mulch.
- Reapply mulch when bare earth becomes visible.

References

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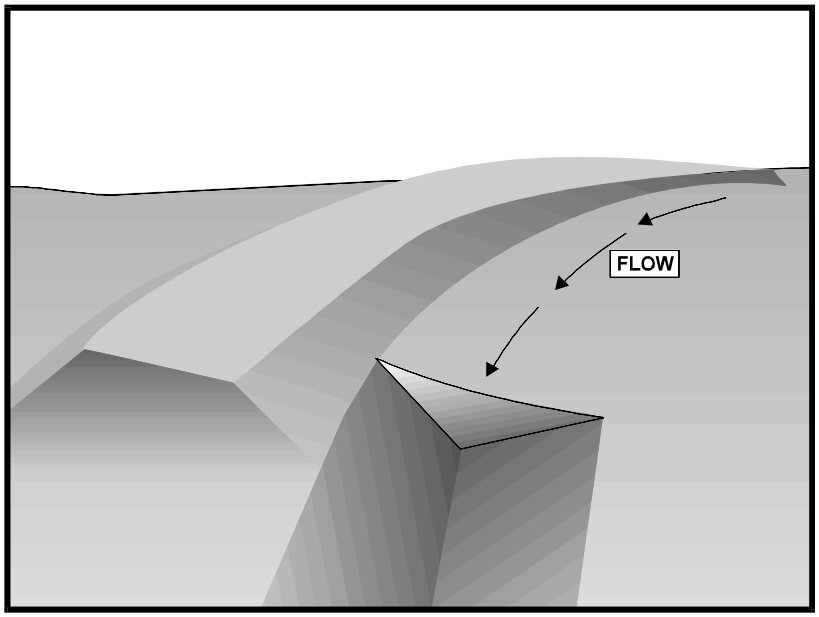
Earth Dikes and Drainage Swales EC-9



Description and Purpose

An earth dike is a temporary berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dikes and drainage swales are used to divert off site runoff around the construction site, divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

Suitable Applications

Earth dikes and drainage swales are suitable for use, individually or together, where runoff needs to be diverted from one area and conveyed to another.

- Earth dikes and drainage swales may be used:
  - To convey surface runoff down sloping land
  - To intercept and divert runoff to avoid sheet flow over sloped surfaces
  - To divert and direct runoff towards a stabilized watercourse, drainage pipe or channel
  - To intercept runoff from paved surfaces
  - Below steep grades where runoff begins to concentrate
  - Along roadways and facility improvements subject to flood drainage

Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

- At the top of slopes to divert runon from adjacent or undisturbed slopes
- At bottom and mid slope locations to intercept sheet flow and convey concentrated flows
- Divert sediment laden runoff into sediment basins or traps

Limitations

Dikes should not be used for drainage areas greater than 10 acres or along slopes greater than 10 percent. For larger areas more permanent drainage structures should be built. All drainage structures should be built in compliance with local municipal requirements.

- Earth dikes may create more disturbed area on site and become barriers to construction equipment.
- Earth dikes must be stabilized immediately, which adds cost and maintenance concerns.
- Diverted stormwater may cause downstream flood damage.
- Dikes should not be constructed of soils that may be easily eroded.
- Regrading the site to remove the dike may add additional cost.
- Temporary drains and swales or any other diversion of runoff should not adversely impact upstream or downstream properties.
- Temporary drains and swales must conform to local floodplain management requirements.
- Earth dikes/drainage swales are not suitable as sediment trapping devices.
- It may be necessary to use other soil stabilization and sediment controls such as check dams, plastics, and blankets, to prevent scour and erosion in newly graded dikes, swales, and ditches.
- Sediment accumulation, scour depressions, and/or persistent non-stormwater discharges can result in areas of standing water suitable for mosquito production in drainage swales.

Implementation

The temporary earth dike is a berm or ridge of compacted soil, located in such a manner as to divert stormwater to a sediment trapping device or a stabilized outlet, thereby reducing the potential for erosion and offsite sedimentation. Earth dikes can also be used to divert runoff from off site and from undisturbed areas away from disturbed areas and to divert sheet flows away from unprotected slopes.

An earth dike does not itself control erosion or remove sediment from runoff. A dike prevents erosion by directing runoff to an erosion control device such as a sediment trap or directing runoff away from an erodible area. Temporary diversion dikes should not adversely impact adjacent properties and must conform to local floodplain management regulations, and should not be used in areas with slopes steeper than 10%.

Slopes that are formed during cut and fill operations should be protected from erosion by runoff. A combination of a temporary drainage swale and an earth dike at the top of a slope can divert

runoff to a location where it can be brought to the bottom of the slope (see EC-11, Slope Drains). A combination dike and swale is easily constructed by a single pass of a bulldozer or grader and compacted by a second pass of the tracks or wheels over the ridge. Diversion structures should be installed when the site is initially graded and remain in place until post construction BMPs are installed and the slopes are stabilized.

Diversion practices concentrate surface runoff, increasing its velocity and erosive force. Thus, the flow out of the drain or swale must be directed onto a stabilized area or into a grade stabilization structure. If significant erosion will occur, a swale should be stabilized using vegetation, chemical treatment, rock rip-rap, matting, or other physical means of stabilization. Any drain or swale that conveys sediment laden runoff must be diverted into a sediment basin or trap before it is discharged from the site.

General

- Care must be applied to correctly size and locate earth dikes, drainage swales. Excessively steep, unlined dikes, and swales are subject to erosion and gully formation.
- Conveyances should be stabilized.
- Use a lined ditch for high flow velocities.
- Select flow velocity based on careful evaluation of the risks due to erosion of the measure, soil types, overtopping, flow backups, washout, and drainage flow patterns for each project site.
- Compact any fills to prevent unequal settlement.
- Do not divert runoff onto other property without securing written authorization from the property owner.
- When possible, install and utilize permanent dikes, swales, and ditches early in the construction process.
- Provide stabilized outlets.

Earth Dikes

Temporary earth dikes are a practical, inexpensive BMP used to divert stormwater runoff. Temporary diversion dikes should be installed in the following manner:

- All dikes should be compacted by earth moving equipment.
- All dikes should have positive drainage to an outlet.
- All dikes should have 2:1 or flatter side slopes, 18 in. minimum height, and a minimum top width of 24 in. Wide top widths and flat slopes are usually needed at crossings for construction traffic.
- The outlet from the earth dike must function with a minimum of erosion. Runoff should be conveyed to a sediment trapping device such as a Sediment Trap (SE-3) or Sediment Basin

(SE-2) when either the dike channel or the drainage area above the dike are not adequately stabilized.

- Temporary stabilization may be achieved using seed and mulching for slopes less than 5% and either rip-rap or sod for slopes in excess of 5%. In either case, stabilization of the earth dike should be completed immediately after construction or prior to the first rain.
- If riprap is used to stabilize the channel formed along the toe of the dike, the following typical specifications apply:

Channel Grade	Riprap Stabilization
0.5-1.0%	4 in. Rock
1.1-2.0%	6 in. Rock
2.1-4.0%	8 in. Rock
4.1-5.0%	8 in. -12 in. Riprap

- The stone riprap, recycled concrete, etc. used for stabilization should be pressed into the soil with construction equipment.
- Filter cloth may be used to cover dikes in use for long periods.
- Construction activity on the earth dike should be kept to a minimum.

Drainage Swales

Drainage swales are only effective if they are properly installed. Swales are more effective than dikes because they tend to be more stable. The combination of a swale with a dike on the downhill side is the most cost effective diversion.

Standard engineering design criteria for small open channel and closed conveyance systems should be used (see the local drainage design manual). Unless local drainage design criteria state otherwise, drainage swales should be designed as follows:

- No more than 5 acres may drain to a temporary drainage swale.
- Place drainage swales above or below, not on, a cut or fill slope.
- Swale bottom width should be at least 2 ft
- Depth of the swale should be at least 18 in.
- Side slopes should be 2:1 or flatter.
- Drainage or swales should be laid at a grade of at least 1 percent, but not more than 15 percent.
- The swale must not be overtopped by the peak discharge from a 10-year storm, irrespective of the design criteria stated above.

- Remove all trees, stumps, obstructions, and other objectionable material from the swale when it is built.
- Compact any fill material along the path of the swale.
- Stabilize all swales immediately. Seed and mulch swales at a slope of less than 5 percent, and use rip-rap or sod for swales with a slope between 5 and 15 percent. For temporary swales, geotextiles and mats (EC-7) may provide immediate stabilization.
- Irrigation may be required to establish sufficient vegetation to prevent erosion.
- Do not operate construction vehicles across a swale unless a stabilized crossing is provided.
- Permanent drainage facilities must be designed by a professional engineer (see the local drainage design criteria for proper design).
- At a minimum, the drainage swale should conform to predevelopment drainage patterns and capacities.
- Construct the drainage swale with a positive grade to a stabilized outlet.
- Provide erosion protection or energy dissipation measures if the flow out of the drainage swale can reach an erosive velocity.

Costs

- Cost ranges from $15 to $55 per ft for both earthwork and stabilization and depends on availability of material, site location, and access.
- Small dikes: $2.50 - $6.50/linear ft; Large dikes: $2.50/yd^3.
- The cost of a drainage swale increases with drainage area and slope. Typical swales for controlling internal erosion are inexpensive, as they are quickly formed during routine earthwork.

Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect ditches and berms for washouts. Replace lost riprap, damaged linings or soil stabilizers as needed.
- Inspect channel linings, embankments, and beds of ditches and berms for erosion and accumulation of debris and sediment. Remove debris and sediment and repair linings and embankments as needed.
- Temporary conveyances should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction

References

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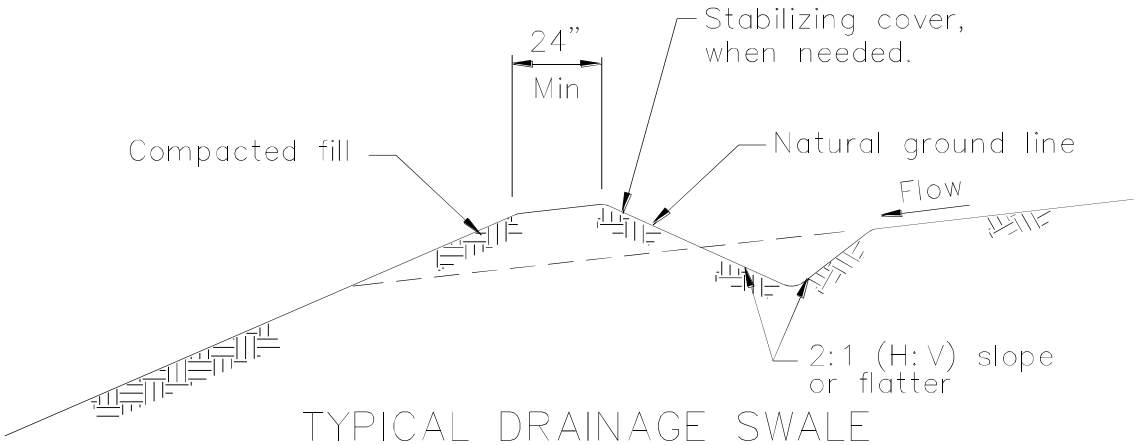
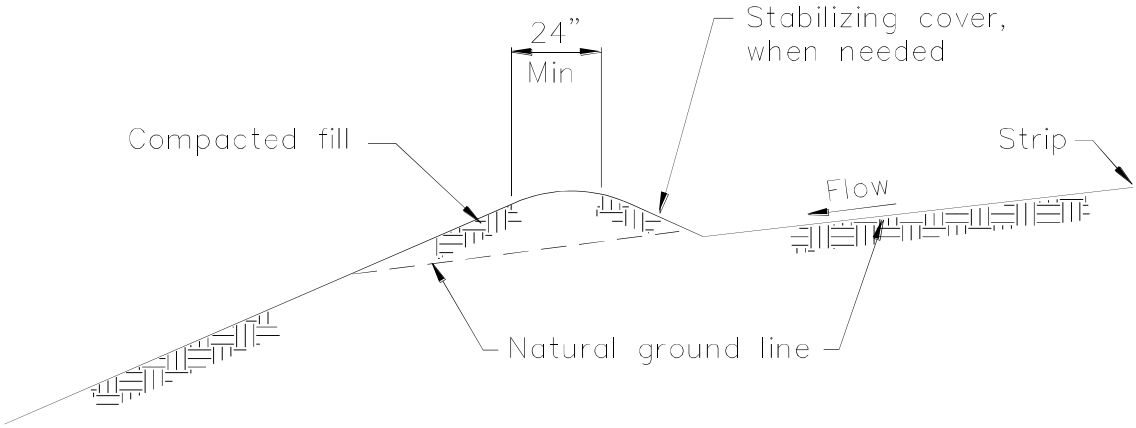


TYPICAL DRAINAGE SWALE
NOT TO SCALE

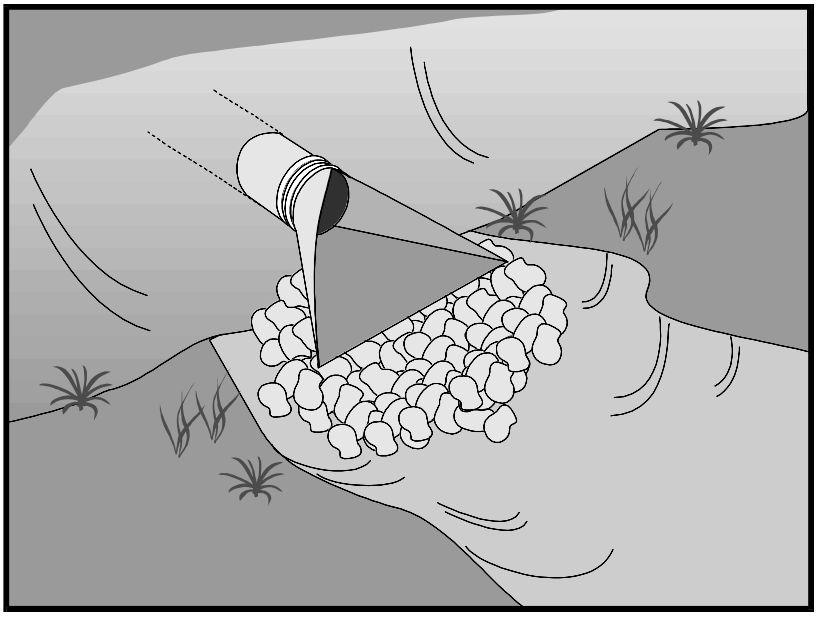
NOTES:

1. Stabilize inlet, outlets and slopes.
2. Properly compact the subgrade.



TYPICAL EARTH DIKE
NOT TO SCALE

Velocity Dissipation Devices EC-10



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Outlet protection is a physical device composed of rock, grouted riprap, or concrete rubble, which is placed at the outlet of a pipe or channel to prevent scour of the soil caused by concentrated, high velocity flows.

Suitable Applications

Whenever discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This includes temporary diversion structures to divert runon during construction.

- These devices may be used at the following locations:
  - Outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, conduits, or channels.
  - Outlets located at the bottom of mild to steep slopes.
  - Discharge outlets that carry continuous flows of water.
  - Outlets subject to short, intense flows of water, such as flash floods.
  - Points where lined conveyances discharge to unlined conveyances

Limitations

- Large storms or high flows can wash away the rock outlet protection and leave the area susceptible to erosion.

- Sediment captured by the rock outlet protection may be difficult to remove without removing the rock.
- Outlet protection may negatively impact the channel habitat.
- Grouted riprap may break up in areas of freeze and thaw.
- If there is not adequate drainage, and water builds up behind grouted riprap, it may cause the grouted riprap to break up due to the resulting hydrostatic pressure.
- Sediment accumulation, scour depressions, and/or persistent non-stormwater discharges can result in areas of standing water suitable for mosquito production in velocity dissipation devices.

Implementation

General

Outlet protection is needed where discharge velocities and energies at the outlets of culverts, conduits or channels are sufficient to erode the immediate downstream reach. This practice protects the outlet from developing small eroded pools (plange pools), and protects against gully erosion resulting from scouring at a culvert mouth.

Design and Layout

As with most channel design projects, depth of flow, roughness, gradient, side slopes, discharge rate, and velocity should be considered in the outlet design. Compliance to local and state regulations should also be considered while working in environmentally sensitive streambeds. General recommendations for rock size and length of outlet protection mat are shown in the rock outlet protection figure in this BMP and should be considered minimums. The apron length and rock size gradation are determined using a combination of the discharge pipe diameter and estimate discharge rate: Select the longest apron length and largest rock size suggested by the pipe size and discharge rate. Where flows are conveyed in open channels such as ditches and swales, use the estimated discharge rate for selecting the apron length and rock size. Flows should be same as the culvert or channel design flow but never the less than the peak 5 year flow for temporary structures planned for one rainy season, or the 10 year peak flow for temporary structures planned for two or three rainy seasons.

- There are many types of energy dissipaters, with rock being the one that is represented in the attached figure.
- Best results are obtained when sound, durable, and angular rock is used.
- Install riprap, grouted riprap, or concrete apron at selected outlet. Riprap aprons are best suited for temporary use during construction. Grouted or wired tied rock riprap can minimize maintenance requirements.
- Rock outlet protection is usually less expensive and easier to install than concrete aprons or energy dissipaters. It also serves to trap sediment and reduce flow velocities.
- Carefully place riprap to avoid damaging the filter fabric.

- Stone 4 in. to 6 in. may be carefully dumped onto filter fabric from a height not to exceed 12 in.

- Stone 8 in. to 12 in. must be hand placed onto filter fabric, or the filter fabric may be covered with 4 in. of gravel and the 8 in. to 12 in. rock may be dumped from a height not to exceed 16 in.

- Stone greater than 12 in. shall only be dumped onto filter fabric protected with a layer of gravel with a thickness equal to one half the D_{50} rock size, and the dump height limited to twice the depth of the gravel protection layer thickness.

- For proper operation of apron: Align apron with receiving stream and keep straight throughout its length. If a curve is needed to fit site conditions, place it in upper section of apron.

- Outlets on slopes steeper than 10 percent should have additional protection.

Costs

Costs are low if material is readily available. If material is imported, costs will be higher. Average installed cost is $150 per device.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subjected to non-stormwater discharges daily while non-stormwater discharges occur. Minimize areas of standing water by removing sediment blockages and filling scour depressions.

- Inspect apron for displacement of the riprap and damage to the underlying fabric. Repair fabric and replace riprap that has washed away. If riprap continues to wash away, consider using larger material.

- Inspect for scour beneath the riprap and around the outlet. Repair damage to slopes or underlying filter fabric immediately.

- Temporary devices should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.

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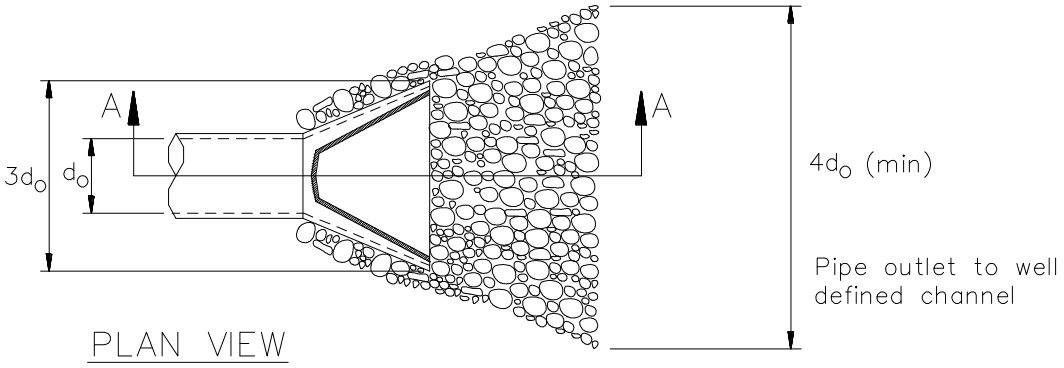
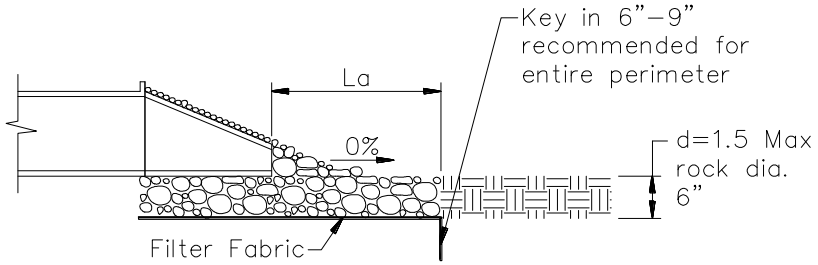


PLAN VIEW

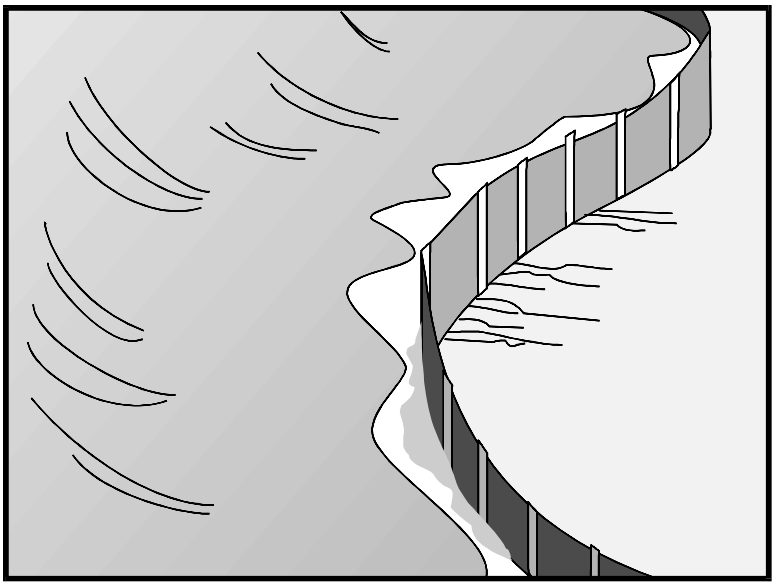


SECTION A–A

Pipe Diameter inches	Discharge ft³/s	Apron Length, La ft	Rip Rap D_{50} Diameter Min inches
12	5	10	4
	10	13	6
18	10	10	6
	20	16	8
	30	23	12
	40	26	16
24	30	16	8
	40	26	8
	50	26	12
	60	30	16

For larger or higher flows consult a Registered Civil Engineer
Source: USDA - SCS

Silt Fence SE-1



Categories		
EC	Erosion Control	
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Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains water, promoting sedimentation of coarse sediment behind the fence. Silt fence does not retain soil fine particles like clays or silts.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences should not be used in locations where the flow is concentrated. Silt fences should always be used in combination with erosion controls. Suitable applications include:

- At perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

Targeted Constituents	
Sediment (coarse sediment)	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm SE-12 Manufactured Linear Sediment Controls

SE-13 Compost Socks and Berms

SE-14 Biofilter Bags

Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard.
- Do not use silt fence to divert water flows or place across any contour line.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Must be trenched and keyed in.
- Not intended for use as a substitute for Fiber Rolls (SE-5), when fiber rolls are being used as a slope interruption device.
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap coarse sediment by intercepting and detaining sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Silt fence should be used in combination with erosion controls up-slope in order to provide the most effective sediment control.
- Silt fence alone is not effective at reducing turbidity. (Barrett and Malina, 2004)
- Designers should consider diverting sediment laden water to a temporary sediment basin or trap. (EPA, 2012)
- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft^2 of ponding area should be provided for every acre draining to the fence.
- Efficiency of silt fences is primarily dependent on the detention time of the runoff behind the control. (Barrett and Malina, 2004)
- The drainage area above any fence should not exceed a quarter of an acre. (Rule of Thumb-100-feet of silt fence per 10,000 square feet of disturbed area.) (EPA 2012)

- The maximum length of slope draining to any point along the silt fence should be 100 ft per foot of silt fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.
- Silt fences should remain in place until the disturbed area draining to the silt fence is permanently stabilized, after which, the silt fence fabric and posts should be removed and properly disposed.
- J-Hooks, which have ends turning up the slope to break up long runs of fence and provide multiple storage areas that work like mini-retention areas, may be used to increase the effectiveness of silt fence.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

In areas where high winds are anticipated the fence should be supported by a plastic or wire mesh. The geotextile fabric of the silt fence should contain ultraviolet inhibitors and stabilizers to provide longevity equivalent to the project life or replacement schedule.

- Layout in accordance with the attached figures.
- For slopes that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to protect silt fence from rocks (e.g., rockfall netting) ensure the integrity of the silt fence installation.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
- Use is generally limited to areas affected by high winds.
- Area draining to fence produces moderate sediment loads.

Materials

Standard Silt Fence

- Silt fence material should be woven geotextile with a minimum width of 36 in. The fabric should conform to the requirements in ASTM designation D6461.
- Wooden stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the

thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts instead of wood stakes.

Installation Guidelines – Traditional Method

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).
- Bottom of the silt fence should be keyed-in a minimum of 12 in.
- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.
- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy–duty wire staples at least 1 in. long. The mesh should extend into the trench.
- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.
- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.
- The trench should be backfilled with native material and compacted.
- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.
- Cross barriers should be a minimum of 1/3 and a maximum of ½ the height of the linear barrier.
- See typical installation details at the end of this fact sheet.

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the geotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
    - Ease of installation (most often done with a 2 person crew).
    - Minimal soil disturbance.
    - Better level of compaction along fence, less susceptible to undercutting
    - Uniform installation.
- Limitations:
    - Does not work in shallow or rocky soils.
    - Complete removal of geotextile material after use is difficult.
    - Be cautious when digging near potential underground utilities.

Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is $7 per linear foot based on vendor research. Range of cost is $3.50 - $9.10 per linear foot.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.
- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches 1/3 of the barrier height.
- Silt fences should be left in place until the upgradient area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.

- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

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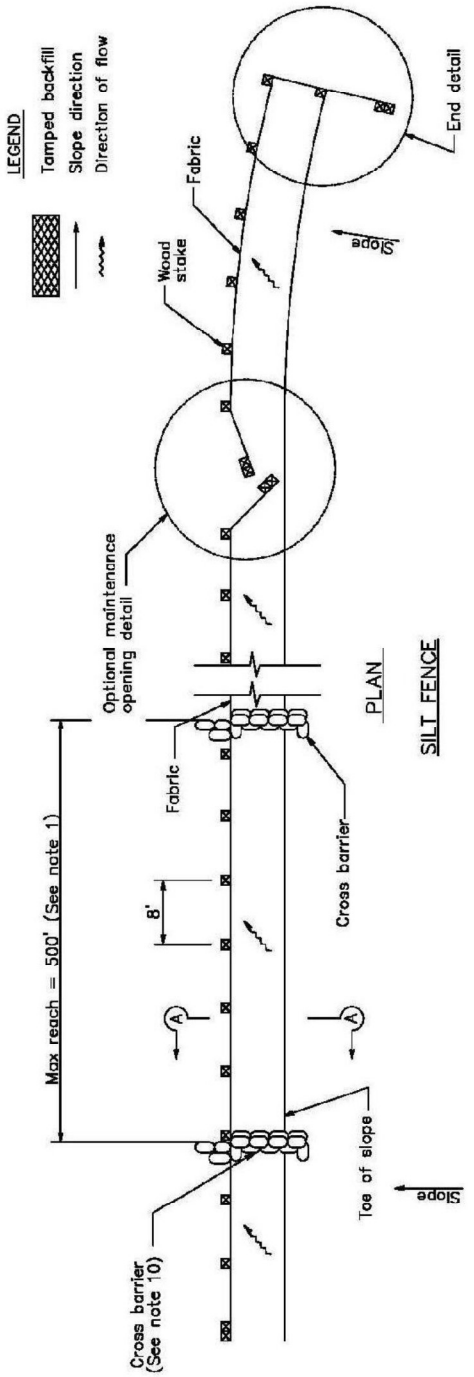
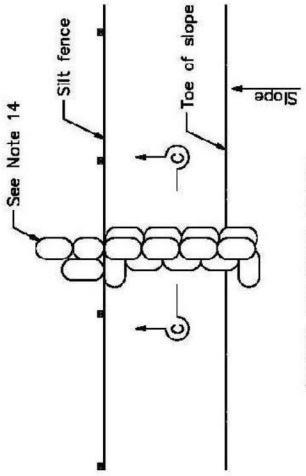
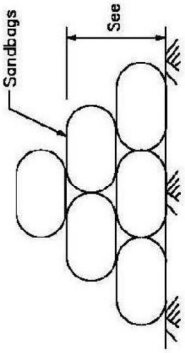
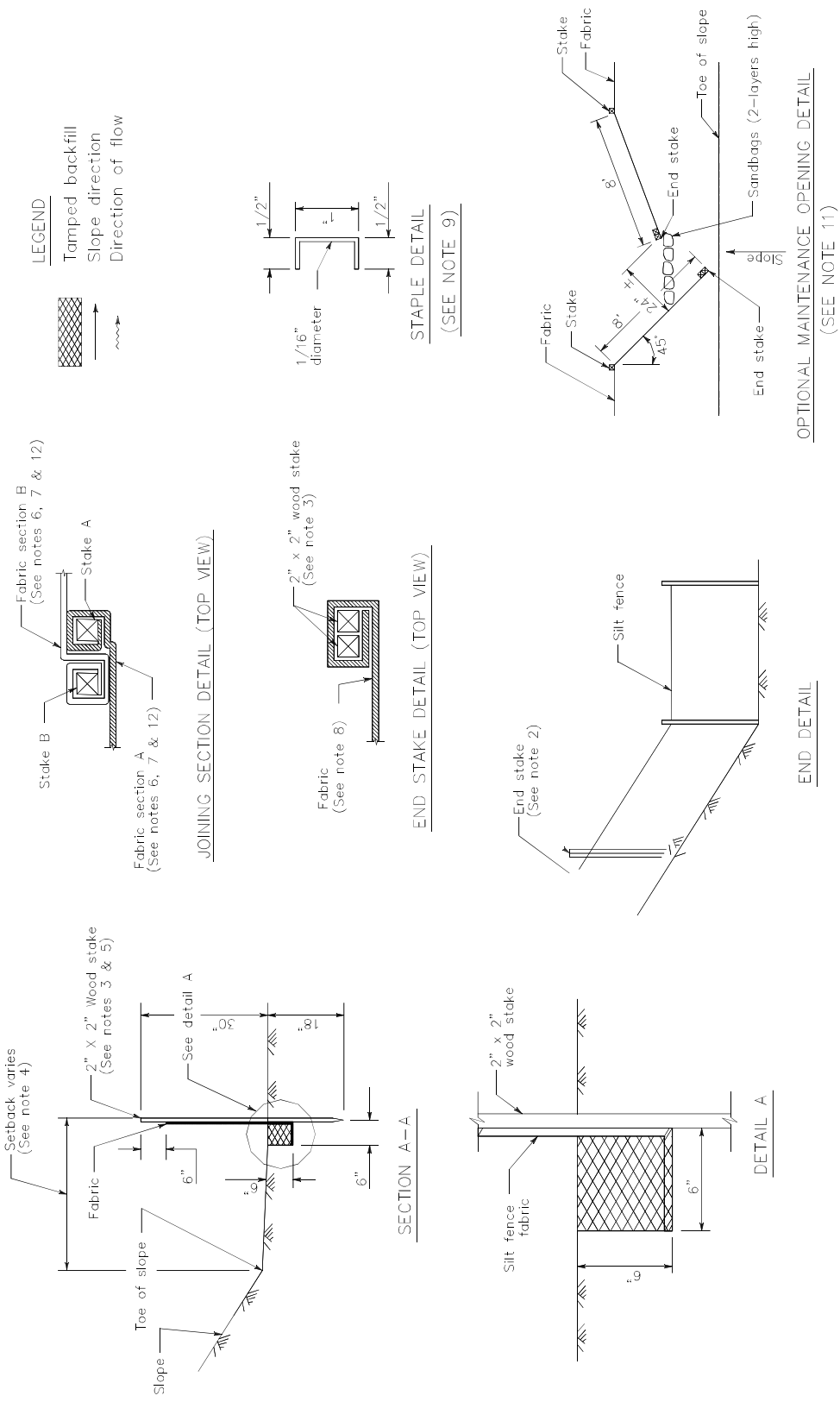


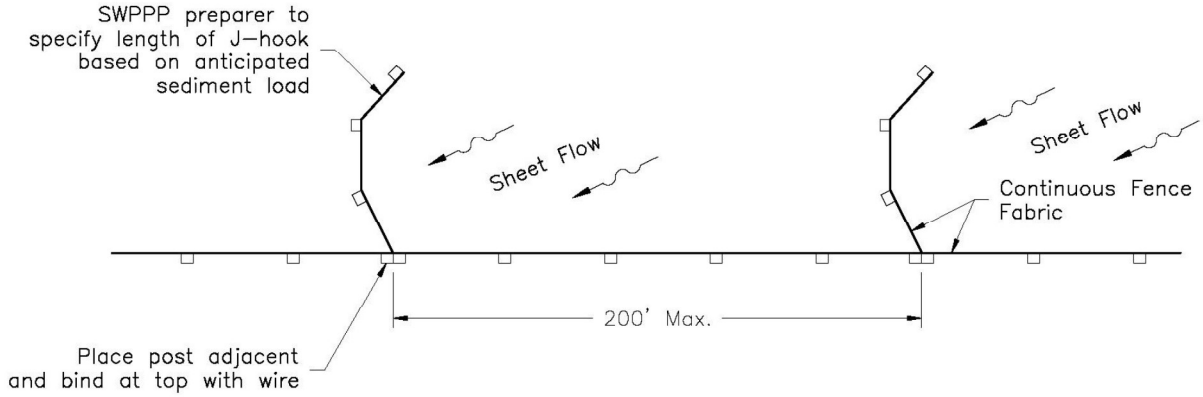




NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'–0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'–0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow–through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3–4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.

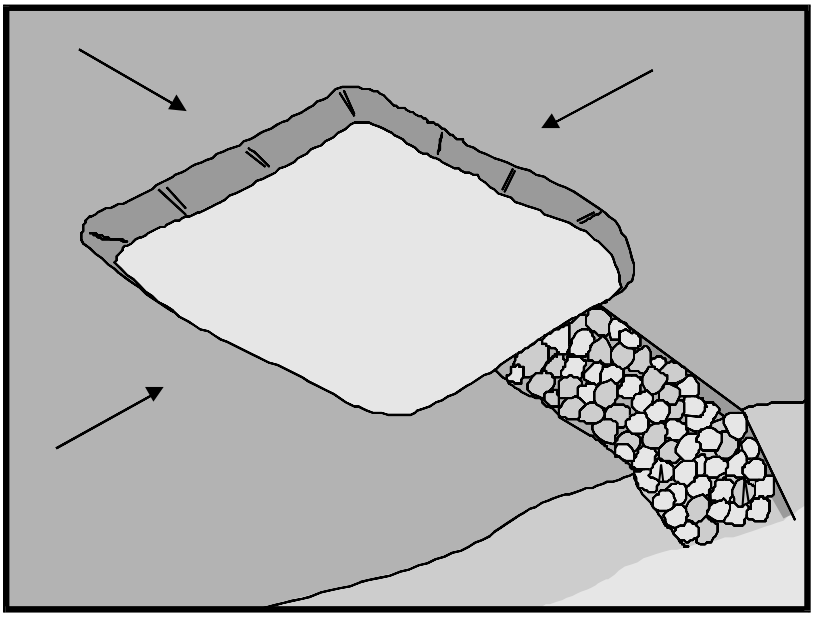

LEGEND
Tamped backfill
Slope direction
Direction of flow
1/2"
1"
1/16" diameter
1/2"
STAPLE DETAIL
(SEE NOTE 9)
Stake
Fabric
Toe of slope
8'
End stake
Sandbags (2-layers high)
4'
2'
8'
45°
Fabric
Stake
End stake
OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)
Fabric section B
(See notes 6, 7 & 12)
Stake A
Stake B
Fabric section A
(See notes 6, 7 & 12)
JOINING SECTION DETAIL (TOP VIEW)
2" x 2" wood stake
(See note 3)
Fabric
(See note 8)
END STAKE DETAIL (TOP VIEW)
Silt fence
End stake
(See note 2)
END DETAIL
Setback varies
(See note 4)
2" X 2" Wood stake
(See notes 3 & 5)
See detail A
30"
18"
Fabric
6"
6"
Toe of slope
Slope
SECTION A-A
2" x 2"
wood stake
Silt fence
fabric
6"
6"
DETAIL A


SWPPP preparer to specify length of J–hook based on anticipated sediment load
Sheet Flow
Sheet Flow
Continuous Fence Fabric
200' Max.
Place post adjacent and bind at top with wire

Plan

J–HOOK

Sediment Trap SE-3



Description and Purpose

A sediment trap is a containment area where sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out or before the runoff is discharged by gravity flow. Sediment traps are formed by excavating or constructing an earthen embankment across a waterway or low drainage area.

Trap design guidance provided in this fact sheet is not intended to guarantee compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. Therefore, optimally designed and maintained sediment traps should be used in conjunction with a comprehensive system of BMPs.

Suitable Applications

Sediment traps should be considered for use:

- At the perimeter of the site at locations where sediment-laden runoff is discharged offsite.
- At multiple locations within the project site where sediment control is needed.
- Around or upslope from storm drain inlet protection measures.
- Sediment traps may be used on construction projects where the drainage area is less than 5 acres. Traps would be

Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-2 Sediment Basin (for larger areas)

placed where sediment-laden stormwater may enter a storm drain or watercourse. SE-2, Sediment Basins, must be used for drainage areas greater than 5 acres.

- As a supplemental control, sediment traps provide additional protection for a water body or for reducing sediment before it enters a drainage system.

Limitations

- Requires large surface areas to permit infiltration and settling of sediment.
- Not appropriate for drainage areas greater than 5 acres.
- Only removes large and medium sized particles and requires upstream erosion control.
- Attractive and dangerous to children, requiring protective fencing.
- Conducive to vector production.
- Should not be located in live streams.

Implementation

Design

A sediment trap is a small temporary ponding area, usually with a gravel outlet, formed by excavation or by construction of an earthen embankment. Its purpose is to collect and store sediment from sites cleared or graded during construction. It is intended for use on small drainage areas with no unusual drainage features and projected for a quick build-out time. It should help in removing coarse sediment from runoff. The trap is a temporary measure with a design life of approximately six months to one year and is to be maintained until the site area is permanently protected against erosion by vegetation and/or structures.

Sediment traps should be used only for small drainage areas. If the contributing drainage area is greater than 5 acres, refer to SE-2, Sediment Basins, or subdivide the catchment area into smaller drainage basins.

Sediment usually must be removed from the trap after each rainfall event. The SWPPP should detail how this sediment is to be disposed, such as in fill areas onsite, or removal to an approved offsite dump. Sediment traps used as perimeter controls should be installed before any land disturbance takes place in the drainage area.

Sediment traps are usually small enough that a failure of the structure would not result in a loss of life, damage to home or buildings, or interruption in the use of public roads or utilities. However, sediment traps are attractive to children and can be dangerous. The following recommendations should be implemented to reduce risks:

- Install continuous fencing around the sediment trap or pond. Consult local ordinances regarding requirements for maintaining health and safety.
- Restrict basin side slopes to 3:1 or flatter.

Sediment trap size depends on the type of soil, size of the drainage area, and desired sediment removal efficiency (see SE-2, Sediment Basin). As a rule of thumb, the larger the basin volume

the greater the sediment removal efficiency. Sizing criteria are typically established under the local grading ordinance or equivalent. The runoff volume from a 2-year storm is a common design criteria for a sediment trap. The sizing criteria below assume that this runoff volume is 0.042 acre-ft/acre (0.5 in. of runoff). While the climatic, topographic, and soil type extremes make it difficult to establish a statewide standard, the following criteria should trap moderate to high amounts of sediment in most areas of California:

- Locate sediment traps as near as practical to areas producing the sediment.
- Trap should be situated according to the following criteria: (1) by excavating a suitable area or where a low embankment can be constructed across a swale, (2) where failure would not cause loss of life or property damage, and (3) to provide access for maintenance, including sediment removal and sediment stockpiling in a protected area.
- Trap should be sized to accommodate a settling zone and sediment storage zone with recommended minimum volumes of 67 yd^3/acre and 33 yd^3/acre of contributing drainage area, respectively, based on 0.5 in. of runoff volume over a 24-hour period. In many cases, the size of an individual trap is limited by available space. Multiple traps or additional volume may be required to accommodate specific rainfall, soil, and site conditions.
- Traps with an impounding levee greater than 4.5 ft tall, measured from the lowest point to the impounding area to the highest point of the levee, and traps capable of impounding more than 35,000 ft^3, should be designed by a Registered Civil Engineer. The design should include maintenance requirements, including sediment and vegetation removal, to ensure continuous function of the trap outlet and bypass structures.
- The outlet pipe or open spillway must be designed to convey anticipated peak flows.
- Use rock or vegetation to protect the trap outlets against erosion.
- Fencing should be provided to prevent unauthorized entry.

Installation

Sediment traps can be constructed by excavating a depression in the ground or creating an impoundment with a small embankment. Sediment traps should be installed outside the area being graded and should be built prior to the start of the grading activities or removal of vegetation. To minimize the area disturbed by them, sediment traps should be installed in natural depressions or in small swales or drainage ways. The following steps must be followed during installation:

- The area under the embankment must be cleared, grubbed, and stripped of any vegetation and root mat. The pool area should be cleared.
- The fill material for the embankment must be free of roots or other woody vegetation as well as oversized stones, rocks, organic material, or other objectionable material. The embankment may be compacted by traversing with equipment while it is being constructed.
- All cut-and-fill slopes should be 3:1 or flatter.
- When a riser is used, all pipe joints must be watertight.

- When a riser is used, at least the top two-thirds of the riser should be perforated with 0.5 in. diameter holes spaced 8 in. vertically and 10 to 12 in. horizontally. See SE-2, Sediment Basin.
- When an earth or stone outlet is used, the outlet crest elevation should be at least 1 ft below the top of the embankment.
- When crushed stone outlet is used, the crushed stone used in the outlet should meet AASHTO M43, size No. 2 or 24, or its equivalent such as MSHA No. 2. Gravel meeting the above gradation may be used if crushed stone is not available.

Costs

Average annual cost per installation and maintenance (18 month useful life) is $0.73 per ft^3 ($1,300 per drainage acre). Maintenance costs are approximately 20% of installation costs.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect outlet area for erosion and stabilize if required.
- Inspect trap banks for seepage and structural soundness, repair as needed.
- Inspect outlet structure and spillway for any damage or obstructions. Repair damage and remove obstructions as needed.
- Inspect fencing for damage and repair as needed.
- Inspect the sediment trap for area of standing water during every visit. Corrective measures should be taken if the BMP does not dewater completely in 96 hours or less to prevent vector production.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the trap capacity. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed of at an appropriate location.
- Remove vegetation from the sediment trap when first detected to prevent pools of standing water and subsequent vector production.
- BMPs that require dewatering shall be continuously attended while dewatering takes place. Dewatering BMPs per NS-2 shall be implemented at all times during dewatering activities.

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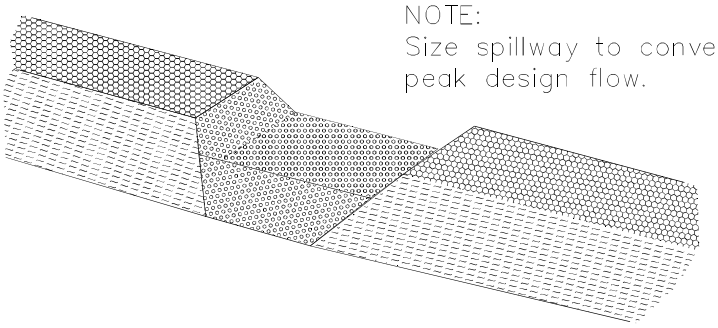
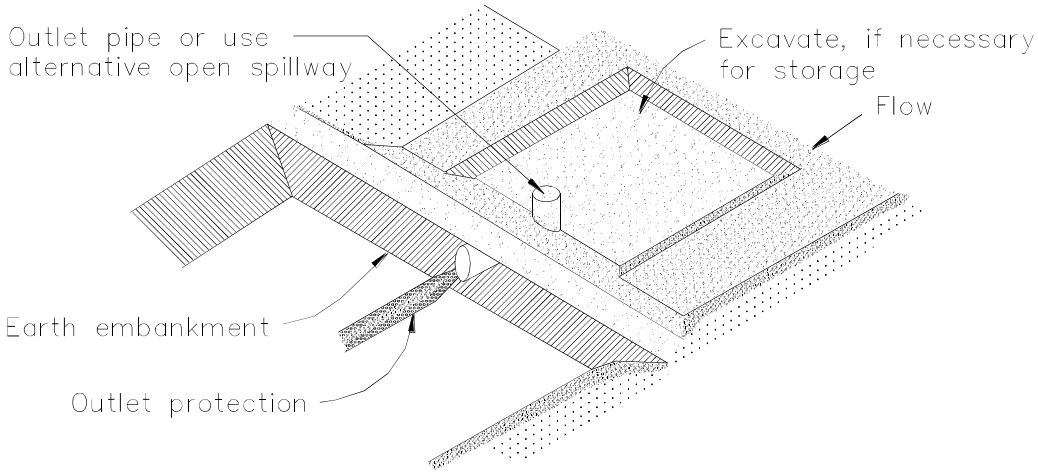
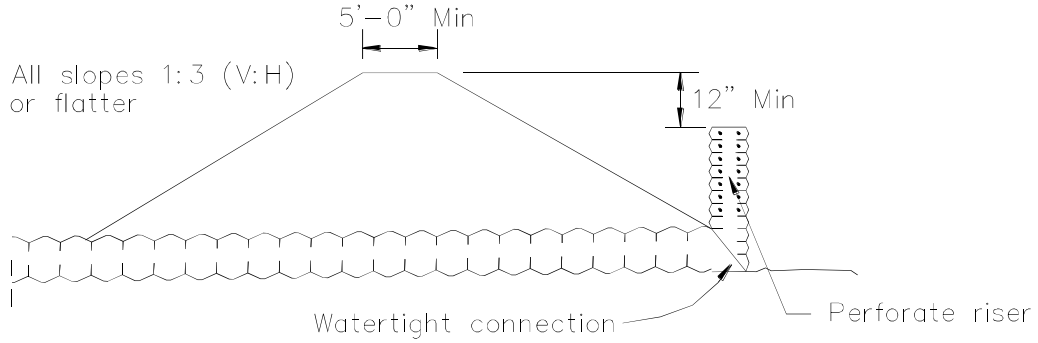


TYPICAL OPEN SPILLWAY

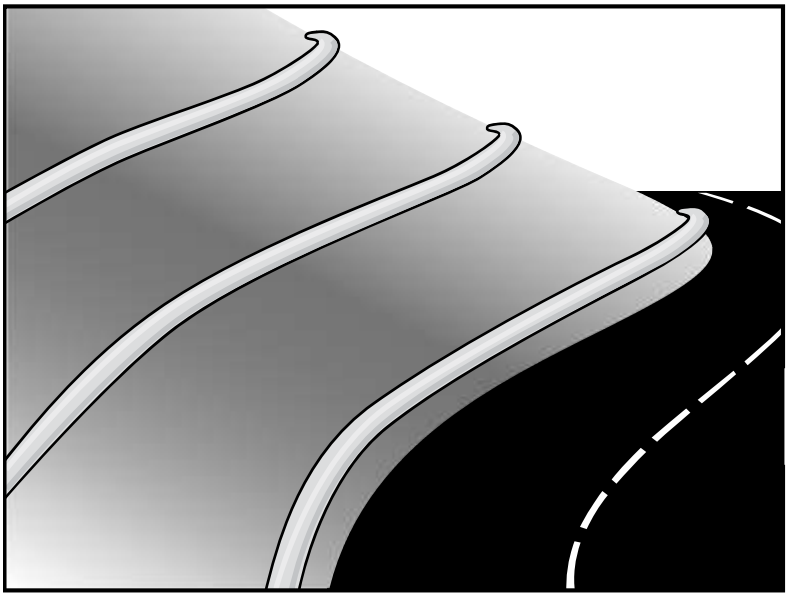




EMBANKMENT SECTION THRU RISER

TYPICAL SEDIMENT TRAP
NOT TO SCALE

Fiber Rolls SE-5



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-12 Manufactured Linear Sediment Controls

SE-14 Biofilter Bags

- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradeable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from $20 - $30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

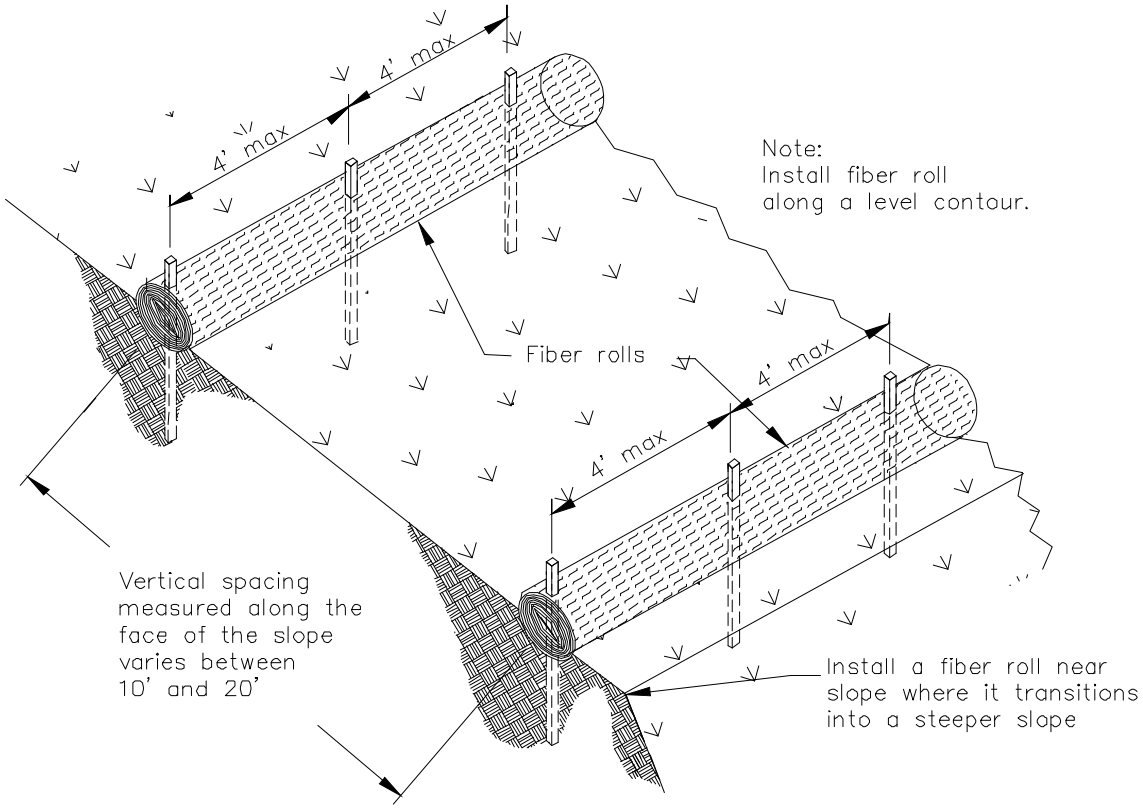
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

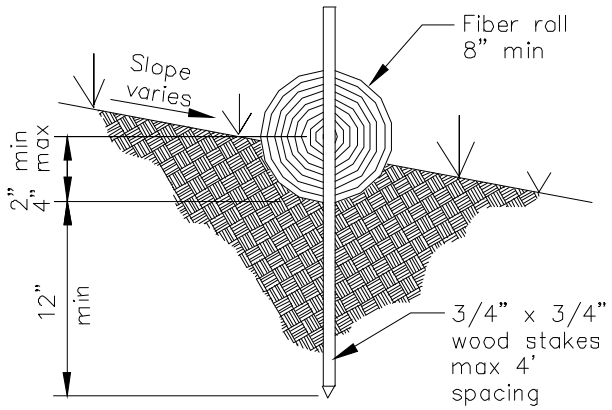
References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

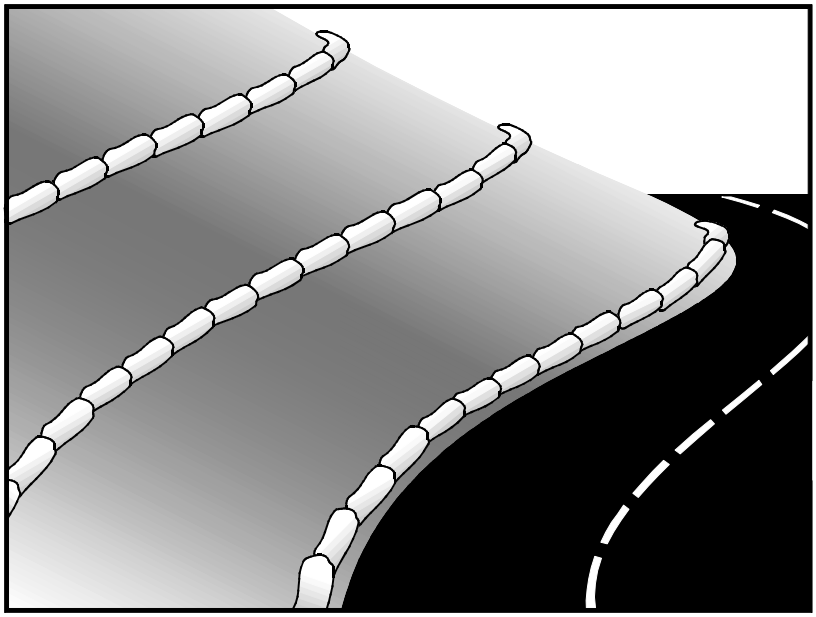


TYPICAL FIBER ROLL INSTALLATION
N.T.S.



ENTRENCHMENT DETAIL
N.T.S.

Gravel Bag Berm SE-6



Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As a linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Roll

SE-8 Sandbag Barrier

SE-12 Temporary Silt Dike

SE-14 Biofilter Bags

- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

Implementation

General

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers, but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more layer construction
  - Top width = 12 in. minimum for one or two layer construction
  - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more layer construction.
  - Top width = 12 in. minimum for one or two layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

Materials

- ***Bag Material:*** Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- ***Bag Size:*** Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials.

- ***Fill Material:*** Fill material should be 0.5 to 1 in. crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

Costs

Material costs for gravel bags are average and are dependent upon material availability. $2.50-3.00 per filled gravel bag is standard based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.

- Reshape or replace gravel bags as needed.

- Repair washouts or other damage as needed.

- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.

- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

References

Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Street Sweeping and Vacuuming SE-7

Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.

- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.
- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 yd^3 hopper) to $88/hour (9 yd^3 hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

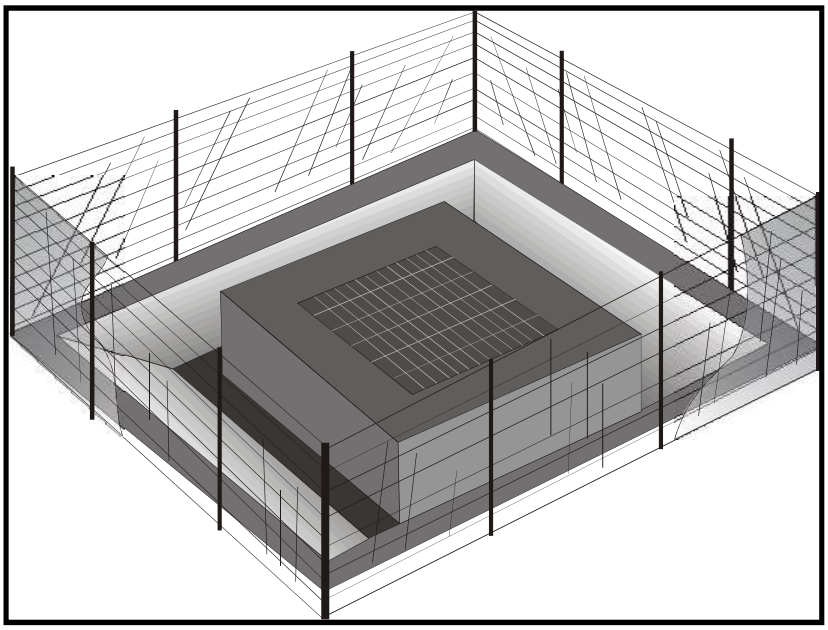
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

Storm Drain Inlet Protection SE-10



Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

Suitable Applications

- Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.
- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use

Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☒
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

SE-13 Compost Socks and Berms

other onsite sediment trapping techniques in conjunction with inlet protection.

- Frequent maintenance is required.
- Limit drainage area to 1 acre maximum. For drainage areas larger than 1 acre, runoff should be routed to a sediment-trapping device designed for larger flows. See BMPs SE-2, Sediment Basin, and SE-3, Sediment Traps.
- Excavated drop inlet sediment traps are appropriate where relatively heavy flows are expected, and overflow capability is needed.

Implementation

General

Inlet control measures presented in this handbook should not be used for inlets draining more than one acre. Runoff from larger disturbed areas should be first routed through SE-2, Sediment Basin or SE-3, Sediment Trap and/or used in conjunction with other drainage control, erosion control, and sediment control BMPs to protect the site. Different types of inlet protection are appropriate for different applications depending on site conditions and the type of inlet. Alternative methods are available in addition to the methods described/shown herein such as prefabricated inlet insert devices, or gutter protection devices.

Design and Layout

Identify existing and planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if storm drain inlet protection is needed and which method to use.

- The key to successful and safe use of storm drain inlet protection devices is to know where runoff that is directed toward the inlet to be protected will pond or be diverted as a result of installing the protection device.
  - Determine the acceptable location and extent of ponding in the vicinity of the drain inlet. The acceptable location and extent of ponding will influence the type and design of the storm drain inlet protection device.
  - Determine the extent of potential runoff diversion caused by the storm drain inlet protection device. Runoff ponded by inlet protection devices may flow around the device and towards the next downstream inlet. In some cases, this is acceptable; in other cases, serious erosion or downstream property damage can be caused by these diversions. The possibility of runoff diversions will influence whether or not storm drain inlet protection is suitable; and, if suitable, the type and design of the device.
- The location and extent of ponding, and the extent of diversion, can usually be controlled through appropriate placement of the inlet protection device. In some cases, moving the inlet protection device a short distance upstream of the actual inlet can provide more efficient sediment control, limit ponding to desired areas, and prevent or control diversions.
- Seven types of inlet protection are presented below. However, it is recognized that other effective methods and proprietary devices exist and may be selected.

- Silt Fence: Appropriate for drainage basins with less than a 5% slope, sheet flows, and flows under 0.5 cfs.

- Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment (SE-3).

- Gravel bag barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. Appropriate for sheet flow or when concentrated flow may exceed 0.5 cfs, and where overtopping is required to prevent flooding.

- Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs.

- Temporary Geotextile Storm drain Inserts: Different products provide different features. Refer to manufacturer details for targeted pollutants and additional features.

- Biofilter Bag Barrier: Used to create a small retention area upstream of inlets and can be located on pavement or soil. Biofilter bags slowly filter runoff allowing sediment to settle out. Appropriate for flows under 0.5 cfs.

- Compost Socks: Allow filtered run-off to pass through the compost while retaining sediment and potentially other pollutants (SE-13). Appropriate for flows under 1.0 cfs.

- Select the appropriate type of inlet protection and design as referred to or as described in this fact sheet.

- Provide area around the inlet for water to pond without flooding structures and property.

- Grates and spaces around all inlets should be sealed to prevent seepage of sediment-laden water.

- Excavate sediment sumps (where needed) 1 to 2 ft with 2:1 side slopes around the inlet.

Installation

- ***DI Protection Type 1 - Silt Fence*** **-** Similar to constructing a silt fence; see BMP SE-1, Silt Fence. Do not place fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced and water flow through the grate will be blocked resulting in flooding. See typical Type 1 installation details at the end of this fact sheet.

  1. Excavate a trench approximately 6 in. wide and 6 in. deep along the line of the silt fence inlet protection device.

  2. Place 2 in. by 2 in. wooden stakes around the perimeter of the inlet a maximum of 3 ft apart and drive them at least 18 in. into the ground or 12 in. below the bottom of the trench. The stakes should be at least 48 in.

  3. Lay fabric along bottom of trench, up side of trench, and then up stakes. See SE-1, Silt Fence, for details. The maximum silt fence height around the inlet is 24 in.

  4. Staple the filter fabric (for materials and specifications, see SE-1, Silt Fence) to wooden stakes. Use heavy-duty wire staples at least 1 in. in length.

5. Backfill the trench with gravel or compacted earth all the way around.

- ***DI Protection Type 2 - Excavated Drop Inlet Sediment Trap -*** Install filter fabric fence in accordance with DI Protection Type 1. Size excavated trap to provide a minimum storage capacity calculated at the rate 67 yd^3/acre of drainage area. See typical Type 2 installation details at the end of this fact sheet.

- ***DI Protection Type 3 - Gravel bag -*** Flow from a severe storm should not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct gravel bags in accordance with SE-6, Gravel Bag Berm. Gravel bags should be used due to their high permeability. See typical Type 3 installation details at the end of this fact sheet.

  1. Construct on gently sloping street.

  2. Leave room upstream of barrier for water to pond and sediment to settle.

  3. Place several layers of gravel bags – overlapping the bags and packing them tightly together.

  4. Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10 year storm) should not overtop the curb.

- ***DI Protection Type 4 – Block and Gravel Filter -*** Block and gravel filters are suitable for curb inlets commonly used in residential, commercial, and industrial construction. See typical Type 4 installation details at the end of this fact sheet.

  1. Place hardware cloth or comparable wire mesh with 0.5 in. openings over the drop inlet so that the wire extends a minimum of 1 ft beyond each side of the inlet structure. If more than one strip is necessary, overlap the strips. Place woven geotextile over the wire mesh.

  2. Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward, not upward. The ends of adjacent blocks should abut. The height of the barrier can be varied, depending on design needs, by stacking combinations of blocks that are 4 in., 8 in., and 12 in. wide. The row of blocks should be at least 12 in. but no greater than 24 in. high.

  3. Place wire mesh over the outside vertical face (open end) of the concrete blocks to prevent stone from being washed through the blocks. Use hardware cloth or comparable wire mesh with 0.5 in. opening.

  4. Pile washed stone against the wire mesh to the top of the blocks. Use 0.75 to 3 in.

- ***DI Protection Type 5 – Temporary Geotextile Insert (proprietary)*** – Many types of temporary inserts are available. Most inserts fit underneath the grate of a drop inlet or inside of a curb inlet and are fastened to the outside of the grate or curb. These inserts are removable and many can be cleaned and reused. Installation of these inserts differs between manufacturers. Please refer to manufacturer instruction for installation of proprietary devices.

- ***DI Protection Type 6 - Biofilter bags –*** Biofilter bags may be used as a substitute for gravel bags in low-flow situations. Biofilter bags should conform to specifications detailed in SE-14, Biofilter bags.

    1. Construct in a gently sloping area.
    2. Biofilter bags should be placed around inlets to intercept runoff flows.
    3. All bag joints should overlap by 6 in.
    4. Leave room upstream for water to pond and for sediment to settle out.
    5. Stake bags to the ground as described in the following detail. Stakes may be omitted if bags are placed on a paved surface.

- ***DI Protection Type 7 – Compost Socks –*** A compost sock can be assembled on site by filling a mesh sock (e.g., with a pneumatic blower). Compost socks do not require special trenching compared to other sediment control methods (e.g., silt fence). Compost socks should conform to specification detailed in SE-13, Compost Socks and Berms.

Costs

- Average annual cost for installation and maintenance of DI Type 1-4 and 6 (one year useful life) is $200 per inlet.
- Temporary geotextile inserts are proprietary and cost varies by region. These inserts can often be reused and may have greater than 1 year of use if maintained and kept undamaged. Average cost per insert ranges from $50-75 plus installation, but costs can exceed $100. This cost does not include maintenance.
- See SE-13 for Compost Sock cost information.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Silt Fences. If the fabric becomes clogged, torn, or degrades, it should be replaced. Make sure the stakes are securely driven in the ground and are in good shape (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes. At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height.
- Gravel Filters. If the gravel becomes clogged with sediment, it should be carefully removed from the inlet and either cleaned or replaced. Since cleaning gravel at a construction site may be difficult, consider using the sediment-laden stone as fill material and put fresh stone around the inlet. Inspect bags for holes, gashes, and snags, and replace bags as needed. Check gravel bags for proper arrangement and displacement.

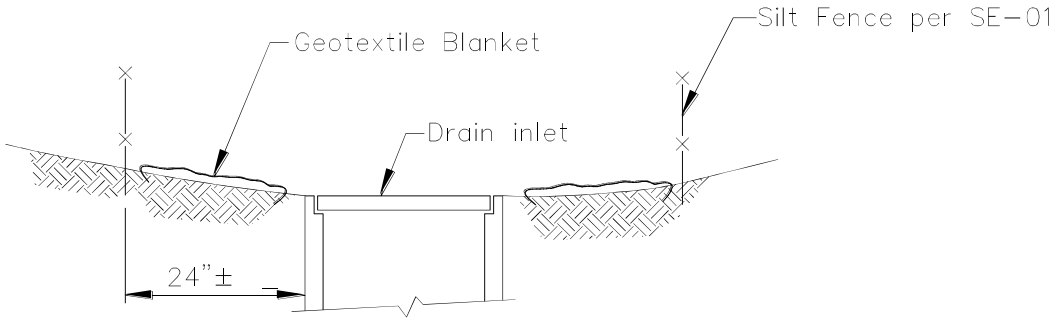
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Inspect and maintain temporary geotextile insert devices according to manufacturer's specifications.
- Remove storm drain inlet protection once the drainage area is stabilized.
    - Clean and regrade area around the inlet and clean the inside of the storm drain inlet, as it should be free of sediment and debris at the time of final inspection.

References

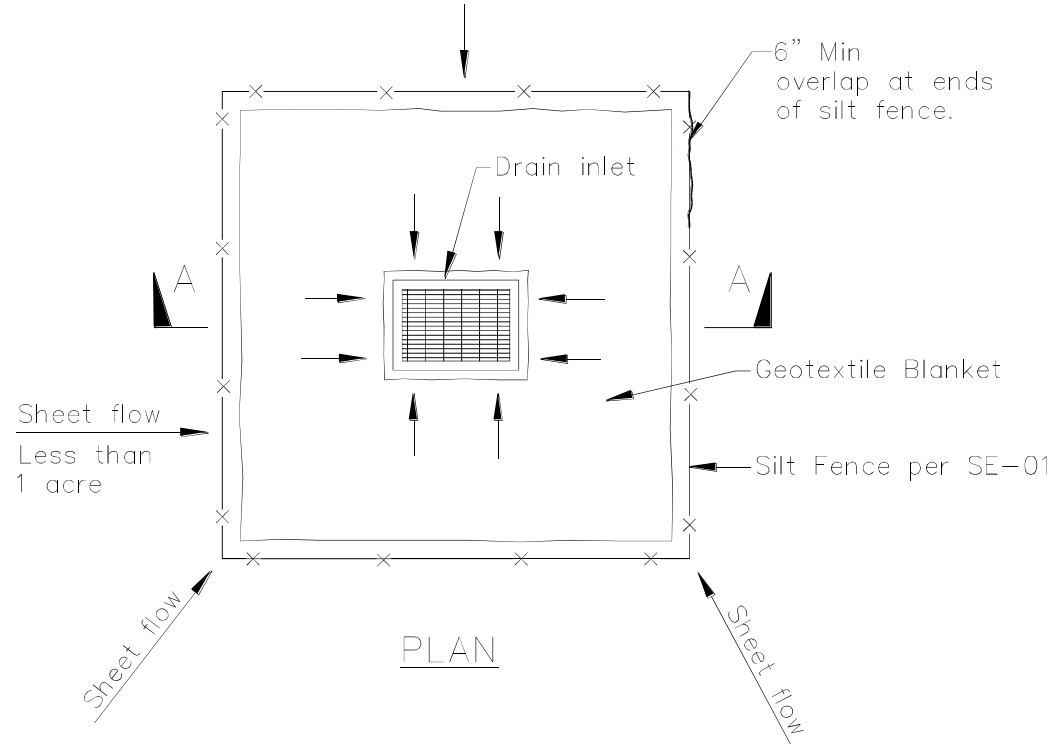
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



SECTION A–A

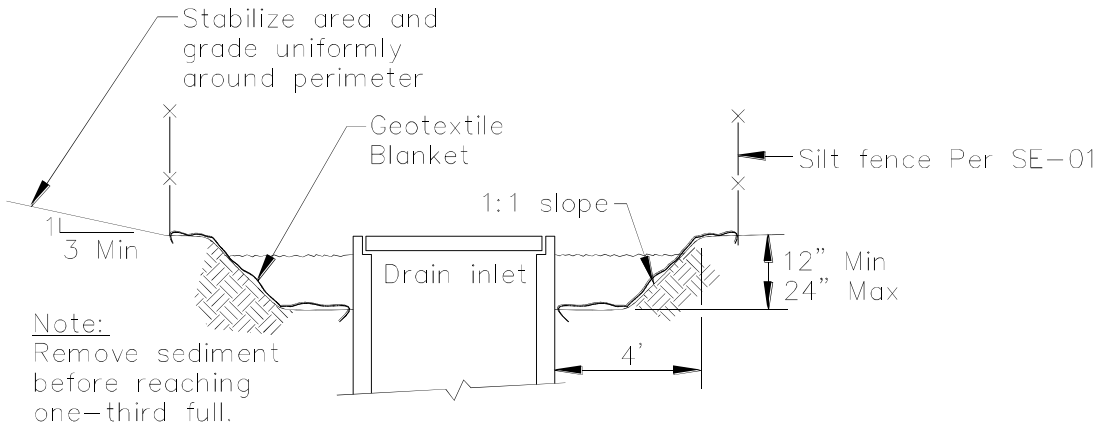


PLAN

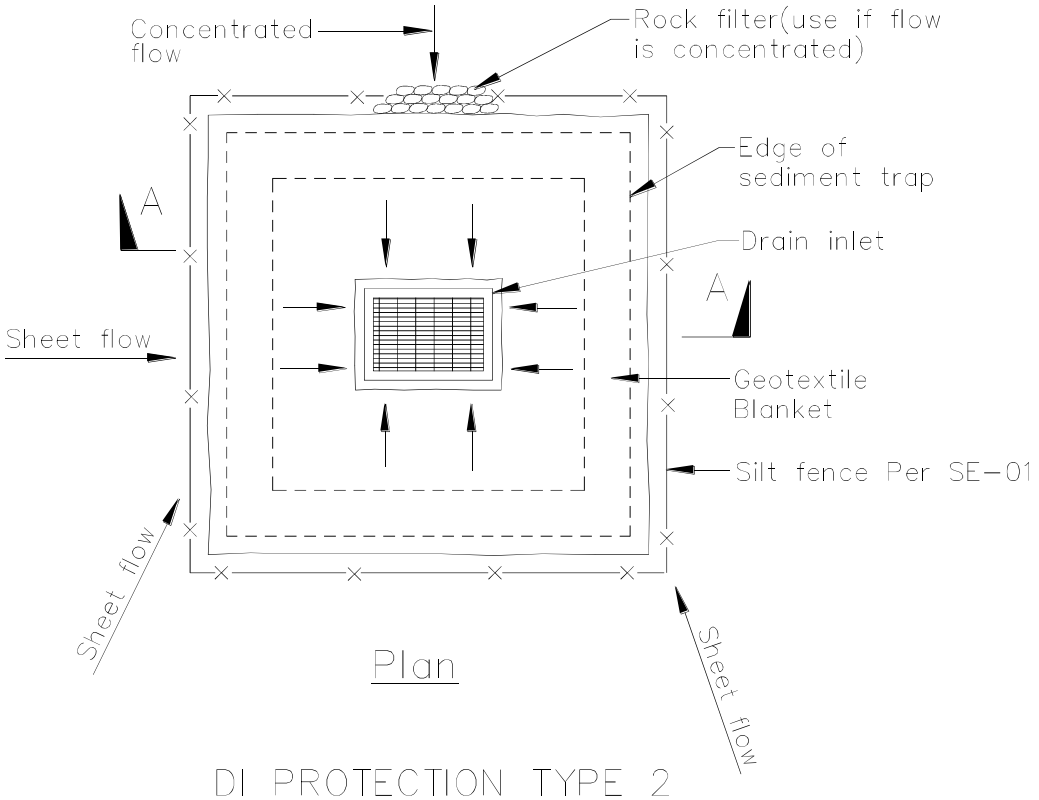
DI PROTECTION TYPE 1
NOT TO SCALE

NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable with concentrated flows.



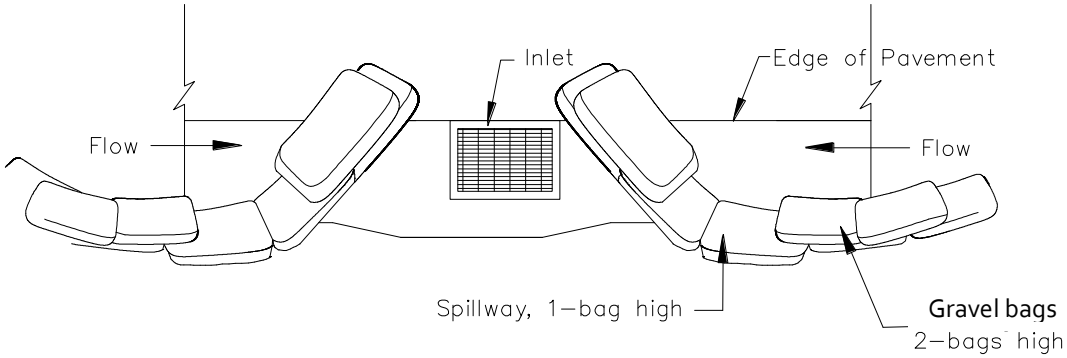
Section A–A



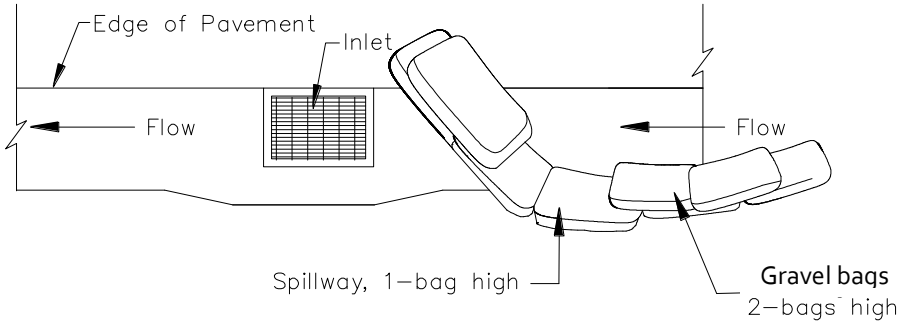
Plan

DI PROTECTION TYPE 2
NOT TO SCALE

Notes
1. For use in cleared and grubbed and in graded areas.
2. Shape basin so that longest inflow area faces longest length of trap.
3. For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



TYPICAL PROTECTION FOR INLET ON SUMP

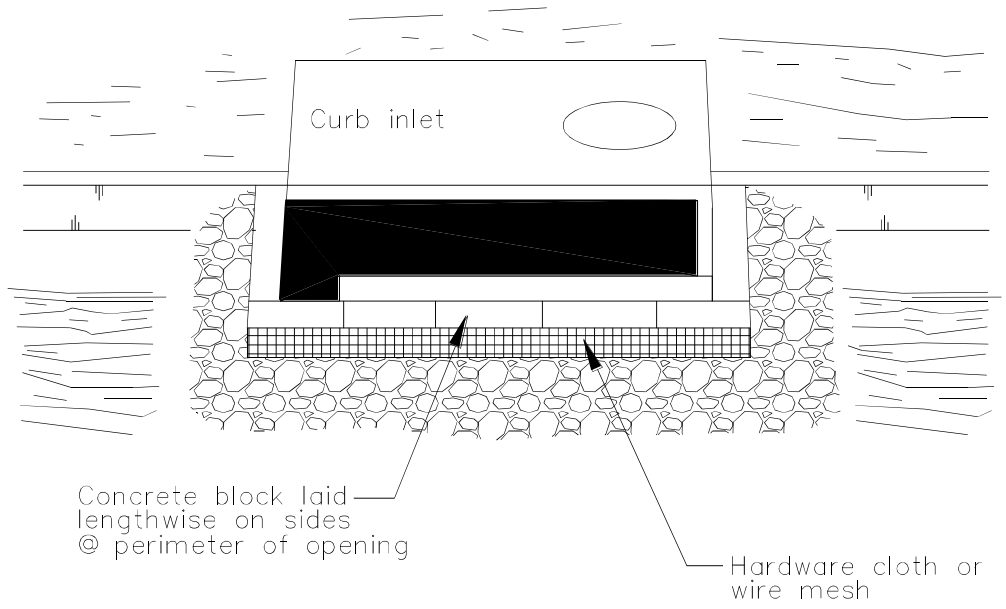


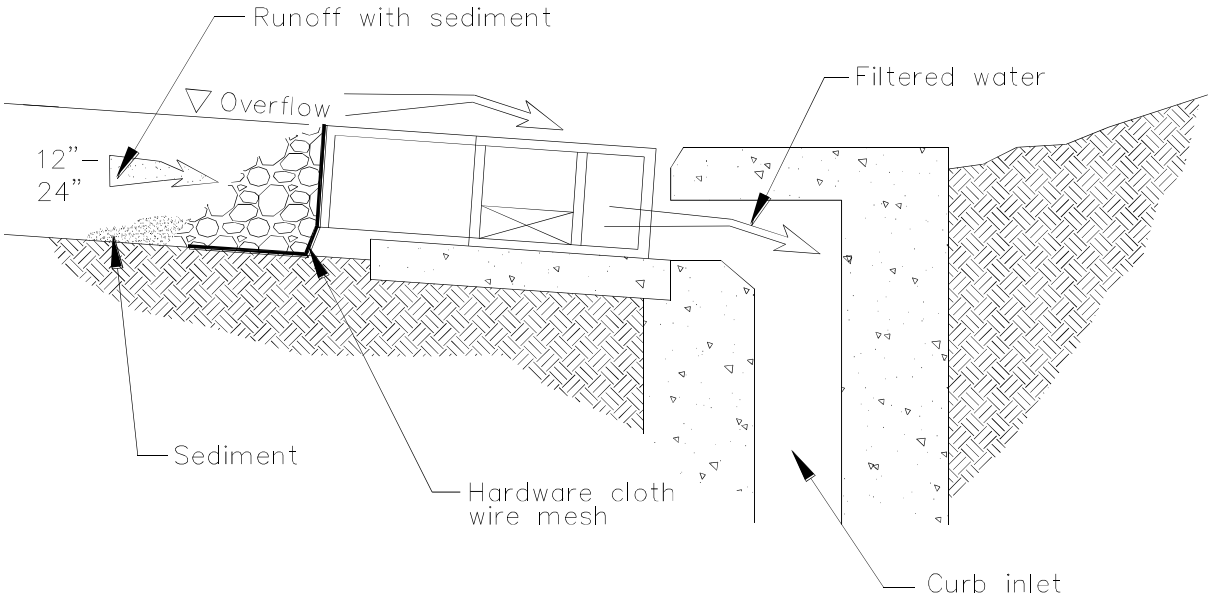
TYPICAL PROTECTION FOR INLET ON GRADE

NOTES:

1. Intended for short–term use.
2. Use to inhibit non–storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.
6. Protection can be effective even if it is not immediately adjacent to the inlet provided that the inlet is protected from potential sources of pollution.

DI PROTECTION TYPE 3
NOT TO SCALE

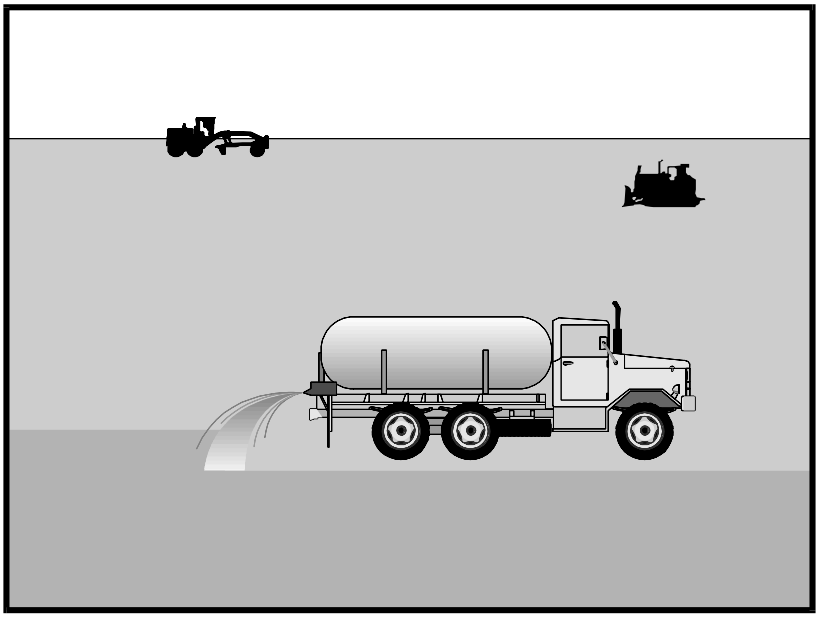




DI PROTECTION – TYPE 4

NOT TO SCALE

Wind Erosion Control WE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montimorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	x	x	x	x	x			x
Disturbed Areas Subject to Traffic			x	x	x	x		x
Material Stockpiles		x	x	x			x	x
Demolition			x			x	x	
Clearing/ Excavation			x	x				x
Truck Traffic on Unpaved Roads			x	x	x	x	x	
Tracking					x	x		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

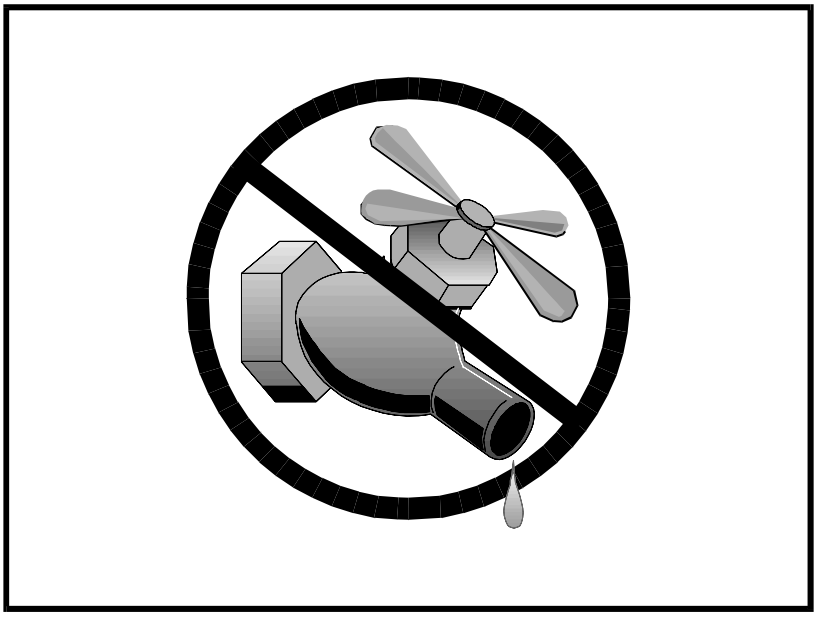
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Water Conservation Practices NS-1



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

If User/Subscriber modifies this fact sheet in any way, the CASQA name/logo and footer below must be removed from each page and not appear on the modified version.

Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.

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- Direct construction water runoff to areas where it can soak into the ground or be collected and reused.
- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs

The cost is small to none compared to the benefits of conserving water.

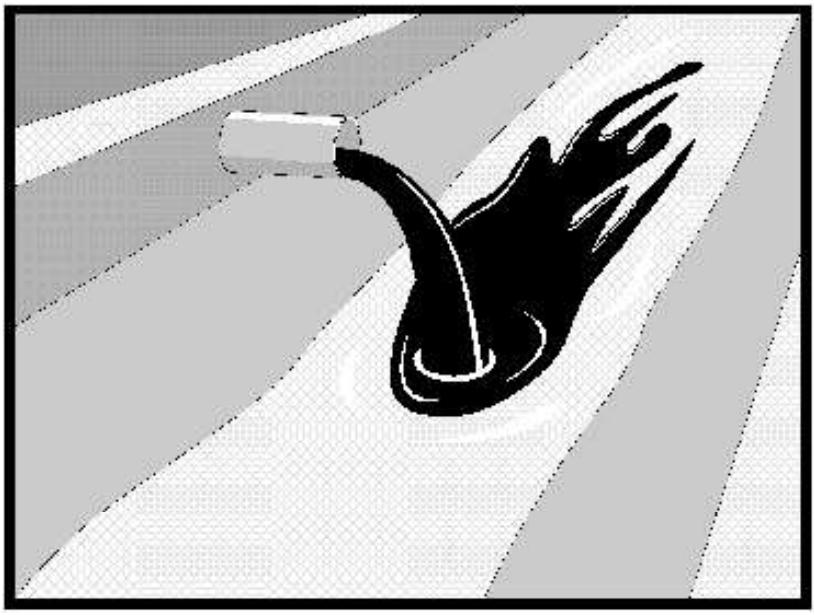
Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Illicit Connection/Discharge NS-6



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Description and Purpose
Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications
This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

Limitations
Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation
Planning
- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives
None

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- Inspect site regularly during project execution for evidence of illicit connections, illegal dumping or discharges.
- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General –** unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

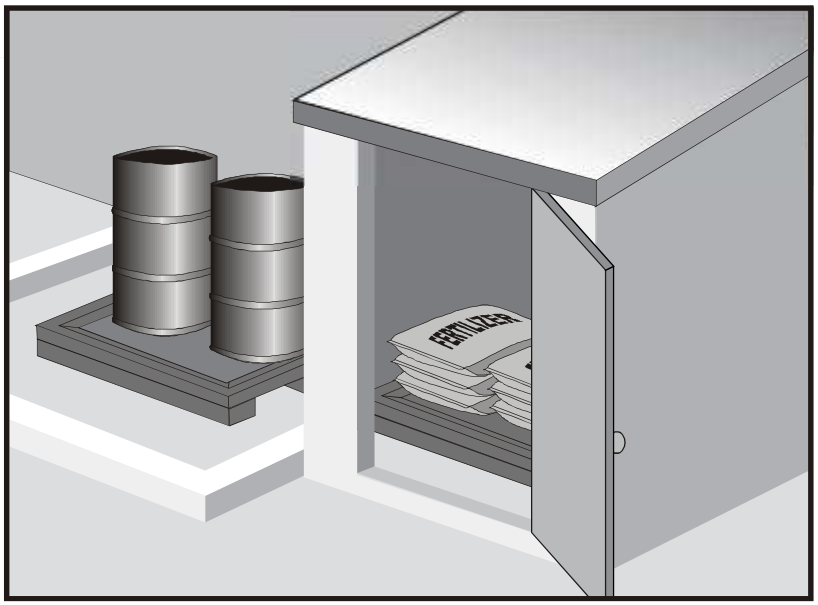
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Material Delivery and Storage WM-1



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
    - Avoid transport near drainage paths or waterways.
    - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
    - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

Material Storage Areas and Practices

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids should be sent to an approved disposal site.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.

- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

Spill Cleanup

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

Cost

- The largest cost of implementation may be in the construction of a materials storage area that is covered and provides secondary containment.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.

- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

References

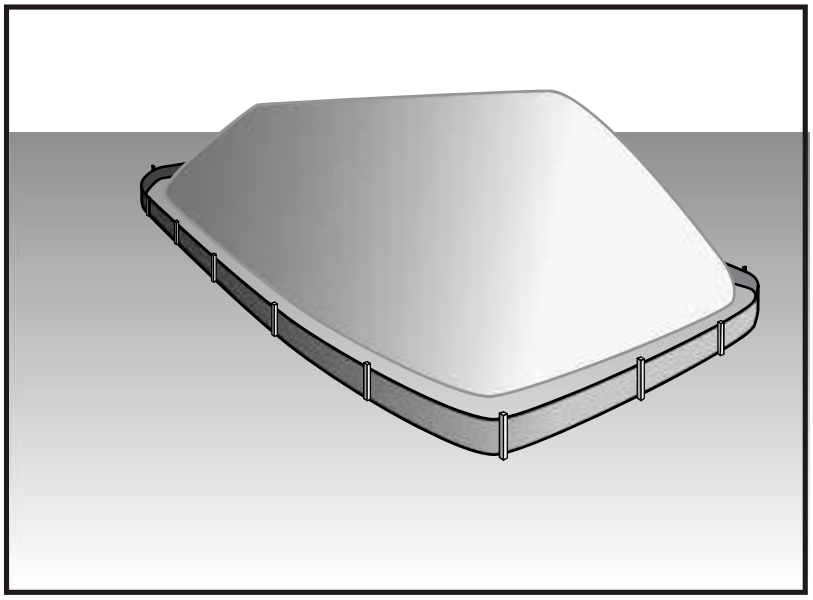
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Stockpile Management WM-3



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of Plastic materials and photodegradable plastics should be avoided.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- After 14 days of inactivity, a stockpile is non-active and requires further protection described below. All stockpiles are required to be protected as non-active stockpiles immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater runon using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

A stockpile is considered non-active if it either is not used for 14 days or if it is scheduled not to be used for 14 days or more. Stockpiles need to be protected immediately if they are not scheduled to be used within 14 days. Non-active stockpiles of the identified materials should be protected as follows:

Soil stockpiles

- Soil stockpiles should be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Temporary vegetation should be considered for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Stockpiles should be covered and protected with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cold mix stockpiles should be placed on and covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Stockpiles of fly ash, stucco, hydrated lime

- Stockpiles of materials that may raise the pH of runoff (i.e., basic materials) should be covered with plastic and surrounded by a berm.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate

- Treated wood should be covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Protection of Active Stockpiles

A stockpile is active when it is being used or is scheduled to be used within 14 days of the previous use. Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

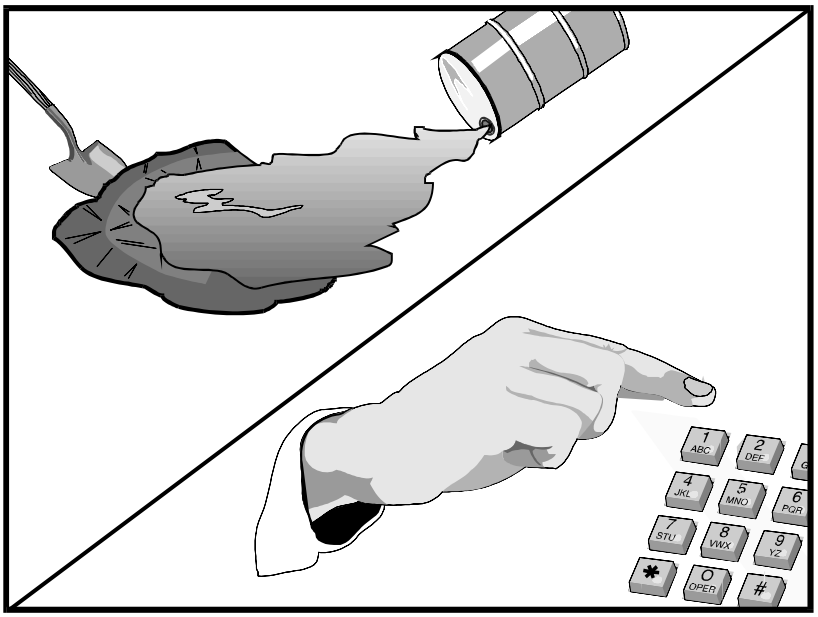
Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Spill Prevention and Control WM-4



Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

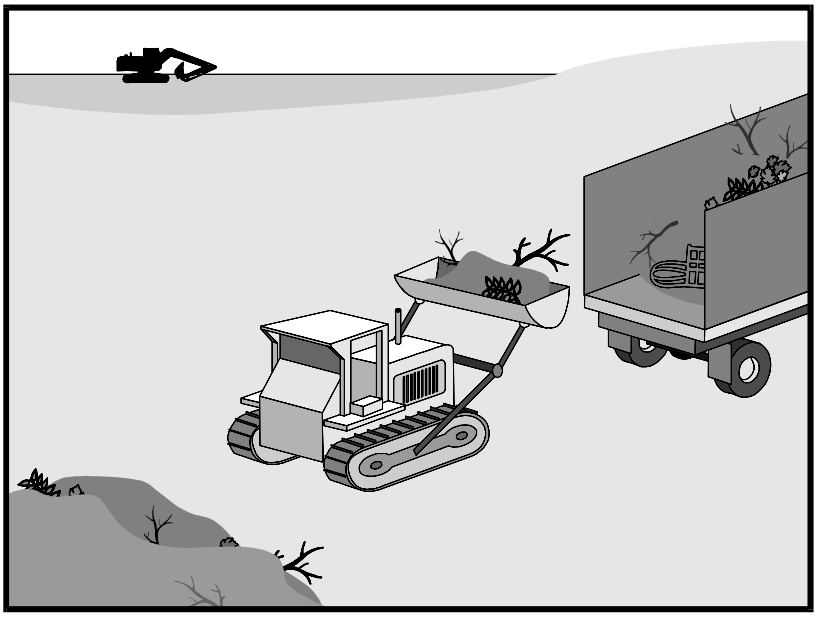
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Solid Waste Management WM-5



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials

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- Highway planting wastes, including vegetative material, plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

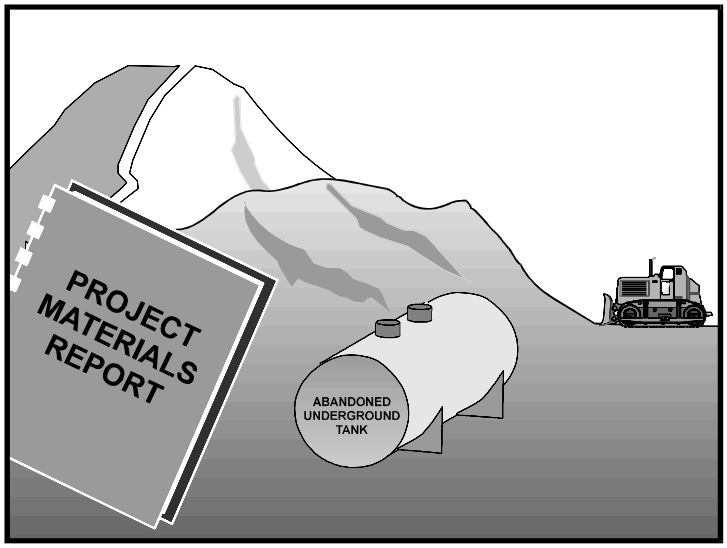
References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Contaminated Soil Management WM-7



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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plans, specifications, and SWPPP. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm a site assessment is completed before earth moving begins.

The following steps will help reduce stormwater pollution from contaminated soil:

- Conduct thorough, pre-construction inspections of the site and review documents related to the site. If inspection or reviews indicated presence of contaminated soils, develop a plan before starting work.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills. Contaminated soil can be expensive to treat and dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- The contractor may further identify contaminated soils by investigating:
  - Past site uses and activities
  - Detected or undetected spills and leaks
  - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements
  - Contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
  - Suspected soils should be tested at a certified laboratory.

Education

- Have employees and subcontractors complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified, prior to performing any excavation work at the locations containing material classified as hazardous.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

Handling Procedures for Material with Aerially Deposited Lead (ADL)

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations should result in no visible dust.
- Caution should be exercised to prevent spillage of lead containing material during transport.

- Quality should be monitored during excavation of soils contaminated with lead.

Handling Procedures for Contaminated Soils

- Minimize onsite storage. Contaminated soil should be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 66265.250 to 66265.260.
- Test suspected soils at an approved certified laboratory.
- Work with the local regulatory agencies to develop options for treatment or disposal if the soil is contaminated.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- Take the following precautions if temporary stockpiling is necessary:
  - Cover the stockpile with plastic sheeting or tarps.
  - Install a berm around the stockpile to prevent runoff from leaving the area.
  - Do not stockpile in or near storm drains or watercourses.
- Remove contaminated material and hazardous material on exteriors of transport vehicles and place either into the current transport vehicle or into the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavate, transport, and dispose of contaminated material and hazardous material in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
  - United States Department of Transportation (USDOT)
  - United States Environmental Protection Agency (USEPA)
  - California Environmental Protection Agency (CAL-EPA)

- California Division of Occupation Safety and Health Administration (CAL-OSHA)
- Local regulatory agencies

Procedures for Underground Storage Tank Removals

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies that have jurisdiction over such work.
- To determine if it contains hazardous substances, arrange to have tested, any liquid or sludge found in the underground tank prior to its removal.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).
- The underground storage tank, any liquid or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal and transported to disposal facilities permitted to accept such waste.

Water Control

- All necessary precautions and preventive measures should be taken to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to, berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, should be discharged to clean, closed top, watertight transportable holding tanks, treated, and disposed of in accordance with federal, state, and local laws.

Costs

Prevention of leaks and spills is inexpensive. Treatment or disposal of contaminated soil can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for contractor's Water Pollution Control Manager, foreman, and/or construction supervisor to monitor onsite contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.

- Implement WM-4, Spill Prevention and Control, to prevent leaks and spills as much as possible.

References

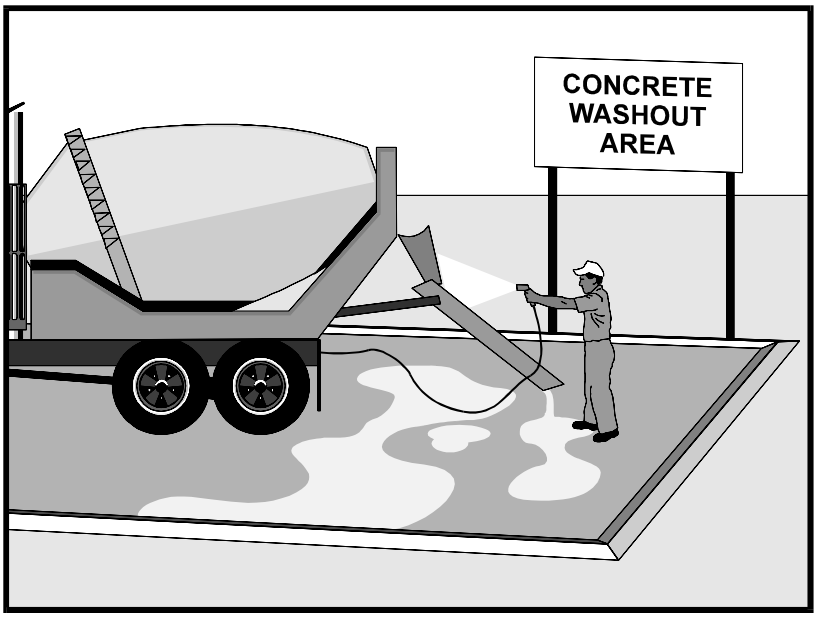
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Concrete Waste Management WM-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.
- Concrete trucks and other concrete-coated equipment are washed onsite.

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- Mortar-mixing stations exist.
- Stucco mixing and spraying.
- See also NS-8, Vehicle and Equipment Cleaning.

Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
  - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
  - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
  - Washouts shall be implemented in a manner that prevents leaching to underlying soils. Washout containers must be water tight and washouts on or in the ground must be lined with a suitable impervious liner, typically a plastic type material.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

Concrete Demolition Wastes

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

Concrete Slurry Wastes

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
    - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
    - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
    - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
    - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a “roll-off”; this concrete washout facility should be properly sealed to prevent leakage, and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
    - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
    - Lath and flagging should be commercial type.
    - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations..

- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Costs

All of the above are low cost measures. Roll-off concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.

- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

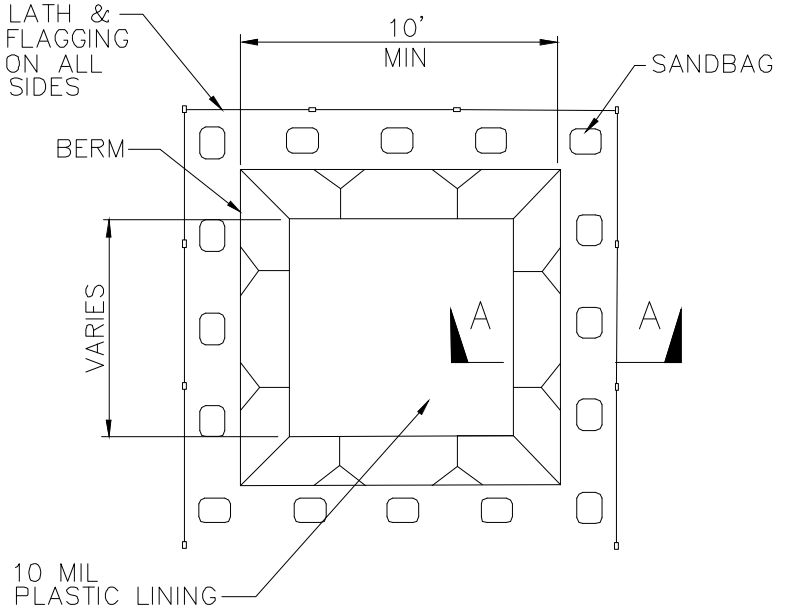
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000, Updated March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



PLAN
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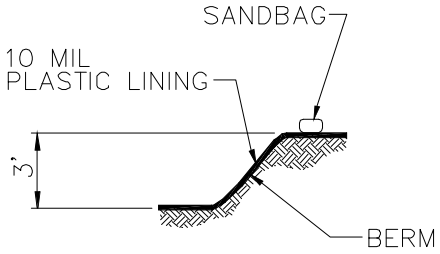
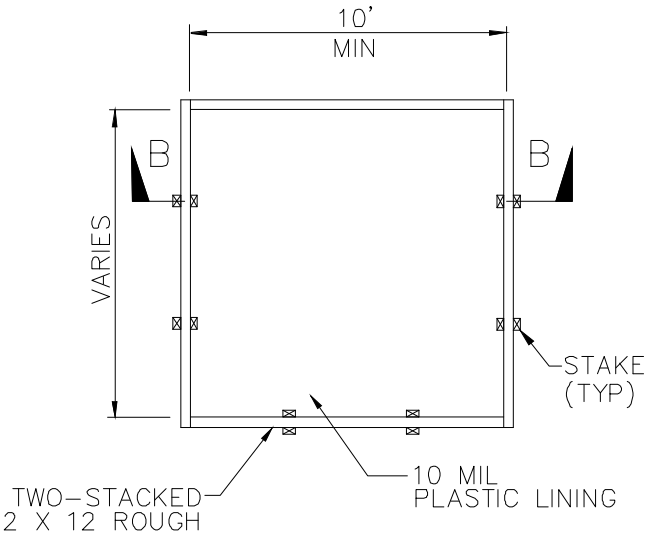


SECTION A–A
NOT TO SCALE



PLAN
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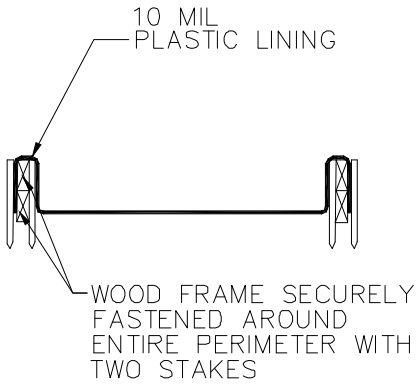
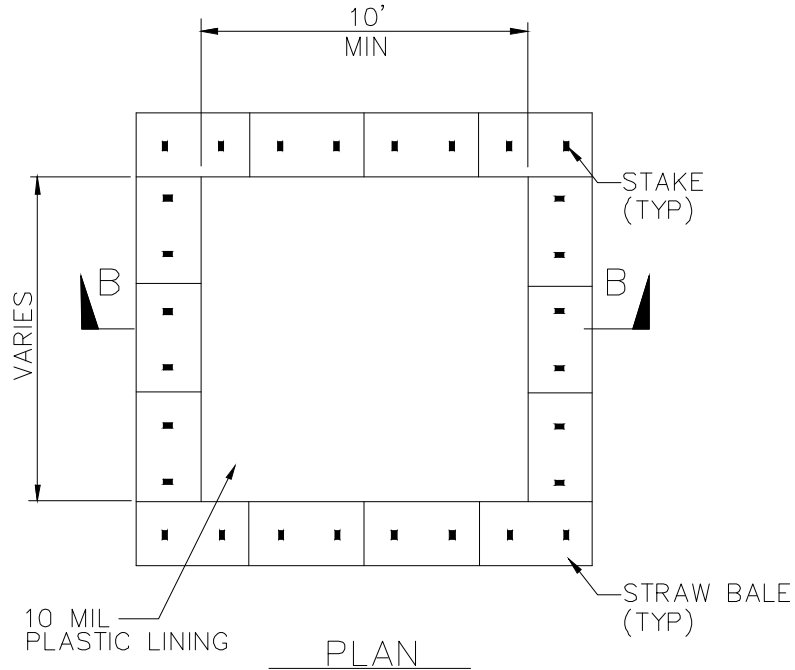


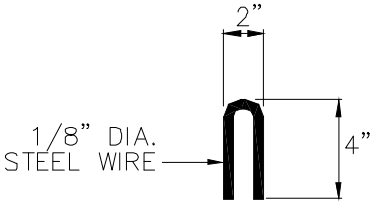
SECTION B–B
NOT TO SCALE

NOTES

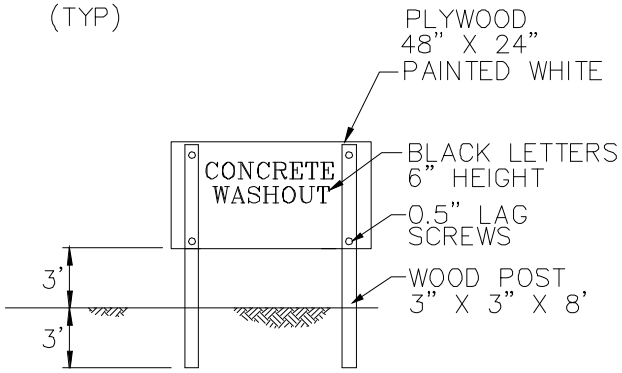
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



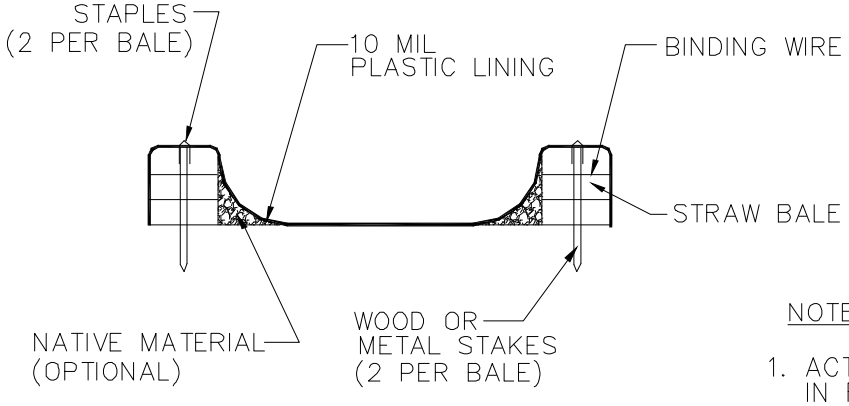
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES



STAPLE DETAIL



CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)

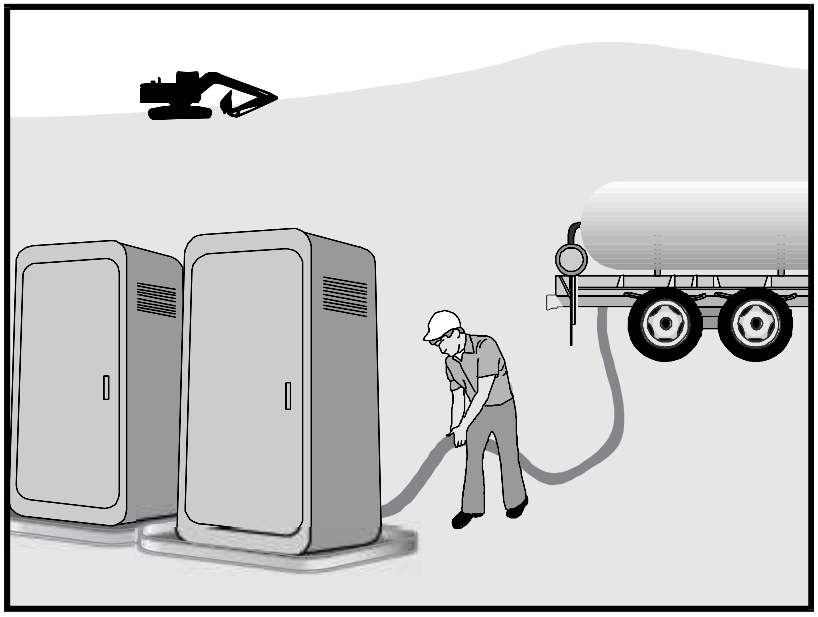


SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Sanitary/Septic Waste Management WM-9



Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Retention/Irrigation TC-12

General Description

Retention/irrigation refers to the capture of stormwater runoff in a holding pond and subsequent use of the captured volume for irrigation of landscape or natural pervious areas. This technology is very effective as a stormwater quality practice in that, for the captured water quality volume, it provides virtually no discharge to receiving waters and high stormwater constituent removal efficiencies. This technology mimics natural undeveloped watershed conditions wherein the vast majority of the rainfall volume during smaller rainfall events is infiltrated through the soil profile. Their main advantage over other infiltration technologies is the use of an irrigation system to spread the runoff over a larger area for infiltration. This allows them to be used in areas with low permeability soils.

Capture of stormwater can be accomplished in almost any kind of runoff storage facility, ranging from dry, concrete-lined ponds to those with vegetated basins and permanent pools. The pump and wet well should be automated with a rainfall sensor to provide irrigation only during periods when required infiltration rates can be realized. Generally, a spray irrigation system is required to provide an adequate flow rate for distributing the water quality volume (LCRA, 1998). Collection of roof runoff for subsequent use (rainwater harvesting) also qualifics as a retention/irrigation practice.

Inspection/Maintenance Considerations

Pollutant removal rates are estimated to be nearly 100% for all pollutants in the captured and irrigated stormwater volume. However, relatively frequent inspection and maintenance is necessary to verify proper operation of these facilities.

Maintenance Concerns, Objectives, and Goals

- Sediment Accumulation
- Mechanical malfunction
- Vector Control

Targeted Constituents

✓	Sediment	■
✓	Nutrients	■
✓	Trash	■
✓	Metals	■
✓	Bacteria	■
✓	Oil and Grease	■
✓	Organics	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

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Inspection Activities	Suggested Frequency
■ The irrigation system should be inspected and tested (or observed while in operation) to verify proper operation multiple times annually. Two of these inspections should occur during or immediately following wet weather. Any leaks, broken spray heads, or other malfunctions with the irrigation system should be repaired immediately.	Frequently (3-6 times per year)
Maintenance Activities	**Suggested Frequency**
■ The upper stage, side slopes, and embankment of a retention basin must be mowed regularly to discourage woody growth and control weeds.	Frequently
■ Remove sediment from inlet structure/sediment forebay, and from around the sump area at least 2 times annually or when depth reaches 3 inches. When sediment in other areas of the basin fills the volume allocated for sediment accumulation, all sediment should be removed and disposed of properly. ■ Grass areas in and around basins must be mowed at least twice annually to limit vegetation height to 18 inches. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas. When mowing is performed, a mulching mower should be used, or grass clippings should be caught and removed. ■ Debris and litter will accumulate near the basin pump and should be removed during regular mowing operations and inspections. Particular attention should be paid to floating debris that can eventually clog the irrigation system.	Semi-annual
■ The pond side slopes and embankment may periodically suffer from slumping and erosion, although this should not occur often if the soils are properly compacted during construction. Regrading and revegetation may be required to correct the problems.	Infrequently

Vegetated Swale TC-30

Maintenance Concerns, Objectives, and Goals

- Channelization
- Vegetation/Landscape Maintenance
- Vector Control
- Aesthetics
- Hydraulic and Removal Efficacy

General Description

Vegetated swales are open, shallow channels with vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. They are designed to treat runoff through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils. Swales can be natural or manmade. They trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of stormwater runoff. Vegetated swales can serve as part of a stormwater drainage system and can replace curbs, gutters and storm sewer systems. Therefore, swales are best suited for residential, industrial, and commercial areas with low flow and smaller populations.

Targeted Constituents

✓	Sediment	▲
✓	Nutrients	●
✓	Trash	●
✓	Metals	▲
✓	Bacteria	●
✓	Oil and Grease	▲
✓	Organics	▲

Legend *(Removal Effectiveness)*

● Low ■ High

▲ Medium

Inspection/Maintenance Considerations

It is important to consider that a thick vegetative cover is needed for vegetated swales to function properly. Usually, swales require little more than normal landscape maintenance activities such as irrigation and mowing to maintain pollutant removal efficiency. Swales can become a nuisance due to mosquito breeding in standing water if obstructions develop (e.g., debris accumulation, invasive vegetation) and/or if proper drainage slopes are not implemented and maintained. The application of fertilizers and pesticides should be minimized.

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Inspection Activities	Suggested Frequency
■ Inspect after seeding and after first major storms for any damages.	Post construction
■ Inspect for signs of erosion, damage to vegetation, channelization of flow, debris and litter, and areas of sediment accumulation. Perform inspections at the beginning and end of the wet season. Additional inspections after periods of heavy runoff are desirable.	Semi-annual
■ Inspect level spreader for clogging, grass along side slopes for erosion and formation of rills or gullies, and sand/soil bed for erosion problems.	Annual
Maintenance Activities	**Suggested Frequency**
■ Mow grass to maintain a height of 3–4 inches, for safety, aesthetic, or other purposes. Litter should always be removed prior to mowing. Clippings should be composted. ■ Irrigate swale during dry season (April through October) or when necessary to maintain the vegetation. ■ Provide weed control, if necessary to control invasive species.	As needed (frequent, seasonally)
■ Remove litter, branches, rocks blockages, and other debris and dispose of properly. ■ Maintain inlet flow spreader (if applicable). ■ Repair any damaged areas within a channel identified during inspections. Erosion rills or gullies should be corrected as needed. Bare areas should be replanted as necessary.	Semi-annual
■ Declog the pea gravel diaphragm, if necessary. ■ Correct erosion problems in the sand/soil bed of dry swales. ■ Plant an alternative grass species if the original grass cover has not been successfully established. Reseed and apply mulch to damaged areas.	Annual (as needed)
■ Remove all accumulated sediment that may obstruct flow through the swale. Sediment accumulating near culverts and in channels should be removed when it builds up to 3 in. at any spot, or covers vegetation, or once it has accumulated to 10% of the original design volume. Replace the grass areas damaged in the process. ■ Rototill or cultivate the surface of the sand/soil bed of dry swales if the swale does not draw down within 48 hours.	As needed (infrequent)

Additional Information

Recent research (Colwell et al., 2000) indicates that grass height and mowing frequency have little impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

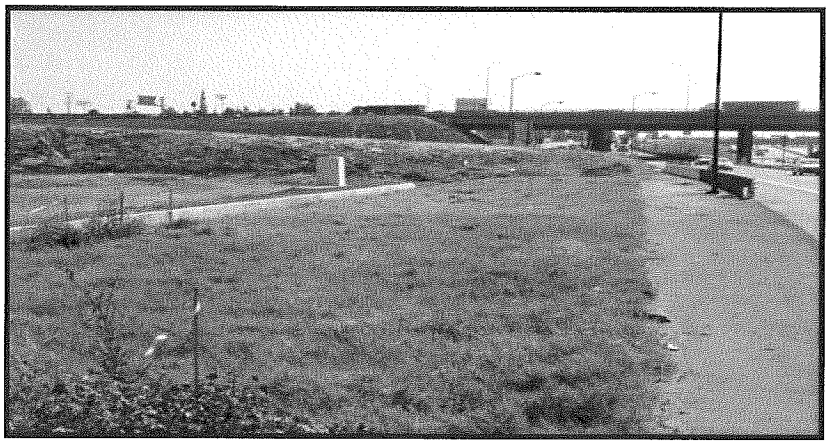
References

Metropolitan Council, Urban Small Sites Best Management Practices Manual. Available at: http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm

U.S. Environmental Protection Agency, Post-Construction Stormwater Management in New Development & Redevelopment BMP Factsheets. Available at: cfpub.epa.gov/npdes/stormwater/menuofbmps/bmp_files.cfm

Ventura Countywide Stormwater Quality Management Program, Technical Guidance Manual for Stormwater Quality Control Measures. July, 2002.

Vegetated Buffer Strip TC-31



Maintenance Concerns, Objectives, and Goals

- Clogged Soil or Outlet Structures
- Invasive Species Management
- Vegetation/Landscape Maintenance
- Erosion
- Channelization of Flow
- Aesthetics

General Description

Grassed buffer strips (vegetated filter strips, filter strips, and grassed filters) are vegetated surfaces that are designed to treat sheet flow from adjacent surfaces. Filter strips function by slowing runoff velocities and allowing sediment and other pollutants to settle and by providing some infiltration into underlying soils. Filter strips were originally used as an agricultural treatment practice and have more recently evolved into an urban practice. With proper design and maintenance, filter strips can provide relatively high pollutant removal. In addition, the public views them as landscaped amenities and not as stormwater infrastructure. Consequently, there is little resistance to their use.

Targeted Constituents

✓	Sediment	■
✓	Nutrients	●
✓	Trash	▲
✓	Metals	■
✓	Bacteria	●
✓	Oil and Grease	■
✓	Organics	▲

Legend *(Removal Effectiveness)*

● Low ■ High

▲ Medium

Inspection/Maintenance Considerations

Vegetated buffer strips require frequent landscape maintenance. In many cases, vegetated buffer strips initially require intense maintenance, but less maintenance is needed over time. In many cases, maintenance tasks can be completed by a landscaping contractor. Maintenance requirements typically include grass or shrub-growing activities such as irrigation, mowing, trimming, removal of invasive species, and replanting when necessary. Buffer strips require more tending as the volume of sediment increases. Vegetated buffer strips can become a nuisance due to mosquito breeding in level spreaders (unless designed to dewater completely in 72 hours or less) and/or if proper drainage slopes are not maintained.

CASQA California Stormwater Quality Association

TC-31 Vegetated Buffer Strip

Inspection Activities	Suggested Frequency
■ Once the vegetated buffer strip is established, inspect at least three times per year. Repair all damage immediately. ■ Inspect buffer strips after seeding and repair as needed.	Post construction
■ Inspect buffer strip and repair all damage immediately. ■ Inspect soil and repair eroded areas.	After major storms
■ Inspect for erosion or damage to vegetation, preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the strips are ready for winter. However, additional inspection after periods of heavy runoff is desirable. ■ Inspect pea-gravel diaphragm/level spreader for clogging and effectiveness and remove built-up sediment. ■ Inspect for rolls and gullies. Immediately fill with topsoil, install erosion control blanket and seed or sod. ■ Inspect to ensure grass is well established. If not, either prepare soil and reseed or replace with alternative species. Install erosion control blanket. ■ Check for debris and litter, and areas of sediment accumulation.	Semi-annual

Maintenance Activities	Suggested Frequency
■ Water plants daily for 2 weeks after construction.	Post construction
■ Mow regularly to maintain vegetation height between 2 - 4 inches, and to promote thick, dense vegetative growth. Cut only when soil is dry to prevent tracking damage to vegetation, soil compaction and flow concentrations. Clippings are to be removed immediately after mowing. ■ Remove all litter, branches, rocks, or other debris. Damaged areas of the filter strip should be repaired immediately by reseeding and applying mulch. ■ Regularly maintain inlet flow spreader. ■ Irrigate during dry season (April through October) when necessary to maintain the vegetation.	Frequently, as needed
■ Remulch void areas. ■ Treat diseased trees and shrubs, remove dead vegetation.	Semi-annual
■ Remove sediment and replant in areas of buildup. Sediment accumulating near culverts and in channels should be removed when it builds up to 3 in. at any spot, or covers vegetation. ■ Limit fertilizer applications based on plant vigor and soil test results. ■ Rework or replant buffer strip if concentrated flow erodes a channel through the strip.	Annual

Additional Information

Recent research (Colwell et al., 2000) indicates that grass height and mowing frequency have little impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

Trash tends to accumulate in swale areas, particularly along highways. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.

References

Metropolitan Council, Urban Small Sites Best Management Practices Manual. Available at: http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm

U.S. Environmental Protection Agency, Post-Construction Stormwater Management in New Development & Redevelopment BMP Factsheets. Available at: cfpub.epa.gov/npdes/stormwater/menuofbmps/bmp_files.cfm

Ventura Countywide Stormwater Quality Management Program, Technical Guidance Manual for Stormwater Quality Control Measures. July, 2002.

Bioretention

TC-32

Maintenance Concerns, Objectives, and Goals

- Clogged Soil or Outlet Structures
- Invasive Species
- Vegetation/Landscape Maintenance
- Erosion
- Channelization of Flow
- Aesthetics

General Description

The bioretention best management practice (BMP) functions as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. These facilities normally consist of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. The runoff's velocity is reduced by passing over or through a sand bed and is subsequently distributed evenly along a ponding area. Exfiltration of the stored water in the bioretention area planting soil into the underlying soils occurs over a period of days.

Targeted Constituents

✓	Sediment	■
✓	Nutrients	▲
✓	Trash	■
✓	Metals	■
✓	Bacteria	■
✓	Oil and Grease	■
✓	Organics	■

Legend *(Removal Effectiveness)*

● Low ■ High

▲ Medium

Inspection/Maintenance Considerations

Bioretention requires frequent landscaping maintenance, including measures to ensure that the area is functioning properly, as well as maintenance of the landscaping on the practice. In many cases, bioretention areas initially require intense maintenance, but less maintenance is needed over time. In many cases, maintenance tasks can be completed by a landscaping contractor, who may already be hired at the site. In cold climates the soil may freeze, preventing runoff from infiltrating into the planting soil.

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California Stormwater Quality Association

Inspection Activities	Suggested Frequency
■ Inspect soil and repair eroded areas.	Monthly
■ Inspect for erosion or damage to vegetation, preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the strips are ready for winter. However, additional inspection after periods of heavy runoff is desirable.	Semi-annual inspection
■ Inspect to ensure grass is well established. If not, either prepare soil and reseed or replace with alternative species. Install erosion control blanket.	
■ Check for debris and litter, and areas of sediment accumulation.	
■ Inspect health of trees and shrubs.	

Maintenance Activities	Suggested Frequency
■ Water plants daily for 2 weeks.	At project completion
■ Remove litter and debris.	Monthly
■ Remove sediment.	As needed
■ Remulch void areas.	
■ Treat diseased trees and shrubs.	
■ Mow turf areas.	
■ Repair erosion at inflow points.	
■ Repair outflow structures.	
■ Unclog underdrain.	
■ Regulate soil pH regulation.	
■ Remove and replace dead and diseased vegetation.	Semi-annual
■ Add mulch.	Annual
■ Replace tree stakes and wires.	
■ Mulch should be replaced every 2 to 3 years or when bare spots appear. Remulch prior to the wet season.	Every 2-3 years, or as needed

Additional Information

Landscaping is critical to the function and aesthetic value of bioretention areas. It is preferable to plant the area with native vegetation, or plants that provide habitat value, where possible. Another important design feature is to select species that can withstand the hydrologic regime they will experience. At the bottom of the bioretention facility, plants that tolerate both wet and dry conditions are preferable. At the edges, which will remain primarily dry, upland species will be the most resilient. It is best to select a combination of trees, shrubs, and herbaceous materials.

References

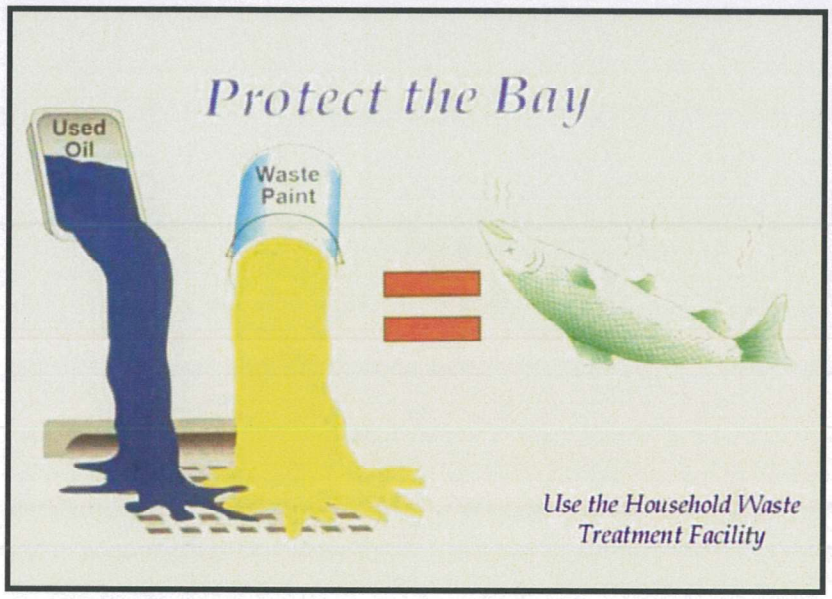
Metropolitan Council, Urban Small Sites Best Management Practices Manual. Available at: http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July, 1998, revised February, 2002.

U.S. Environmental Protection Agency, Post-Construction Stormwater Management in New Development & Redevelopment BMP Factsheets. Available at: cfpub.epa.gov/npdes/stormwater/menuofbmps/bmp_files.cfm

Ventura Countywide Stormwater Quality Management Program, Technical Guidance Manual for Stormwater Quality Control Measures. July, 2002.

Non-Stormwater Discharges SC-10



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, air conditioner condensate, etc. However there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains. They can generally be detected through a combination of detection and elimination. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of pollutants on streets and into the storm drain system and creeks.

Targeted Constituents

Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Approach

Initially the industry must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is in the elimination of non-stormwater discharges.

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Pollution Prevention

- Ensure that used oil, used antifreeze, and hazardous chemical recycling programs are being implemented. Encourage litter control.

Suggested Protocols

Recommended Complaint Investigation Equipment

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms
  - Educational materials

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled or demarcated next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- See SC44 Stormwater Drainage System Maintenance for additional information.

Illicit Connections

- Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of "as-built" piping schematics.
- Isolate problem areas and plug illicit discharge points.
- Locate and evaluate all discharges to the industrial storm drain system.

Visual Inspection and Inventory

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- A review of the "as-built" piping schematic is a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.
- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Drainage System

- TV Cameras can be employed to visually identify illicit connections to the industrial storm drainage system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Once a site has been cleaned:

- Post "No Dumping" signs with a phone number for reporting dumping and disposal.
- Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.
- See fact sheet SC11 Spill Prevention, Control, and Cleanup.

Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.
- Document and report annually the results of the program.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Training

- Training of technical staff in identifying and documenting illegal dumping incidents is required.
- Consider posting the quick reference table near storm drains to reinforce training.
- Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.

- Educate employees about spill prevention and cleanup.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.
- Conduct spill response drills annually (if no events occurred to evaluate your plan) in cooperation with other industries.
- When a responsible party is identified, educate the party on the impacts of his or her actions.

Spill Response and Prevention

- See SC11 Spill Prevention Control and Cleanup.

Other Considerations

- Many facilities do not have accurate, up-to-date schematic drawings.

Requirements

Costs (including capital and operation & maintenance)

- The primary cost is for staff time and depends on how aggressively a program is implemented.
- Cost for containment and disposal is borne by the discharger.
- Illicit connections can be difficult to locate especially if there is groundwater infiltration.
- Indoor floor drains may require re-plumbing if cross-connections to storm drains are detected.

Maintenance (including administrative and staffing)

- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

Supplemental Information

Further Detail of the BMP

Illegal Dumping

- Substances illegally dumped on streets and into the storm drain systems and creeks include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. All of these wastes cause stormwater and receiving water quality problems as well as clog the storm drain system itself.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots

- Types and quantities (in some cases) of wastes
- Patterns in time of occurrence (time of day/night, month, or year)
- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges to the stormwater collection system may include any water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Facilities subject to stormwater permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The State's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Performance Evaluation

- Review annually internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Spill Prevention, Control & Cleanup SC-11

Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental or illegal spills. Preparation for accidental or illegal spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify potential spill areas, specify material handling procedures, describe spill response procedures, and provide spill clean-up equipment. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Approach

Pollution Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- Develop a Spill Prevention Control and Countermeasure (SPCC) Plan. The plan should include:

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- Description of the facility, owner and address, activities and chemicals present
- Facility map
- Notification and evacuation procedures
- Cleanup instructions
- Identification of responsible departments
- Identify key spill response personnel

- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

Suggested Protocols (including equipment needs)

Spill Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- If consistent illegal dumping is observed at the facility:
  - Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - Landscaping and beautification efforts may also discourage illegal dumping.
  - Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- Store and contain liquid materials in such a manner that if the tank is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

- If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

- Routine maintenance:
  - Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.
  - Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
  - Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain.*

  - Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- Label all containers according to their contents (e.g., solvent, gasoline).
- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).
- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).
- Identify key spill response personnel.

Spill Control and Cleanup Activities

- Follow the Spill Prevention Control and Countermeasure Plan.
- Clean up leaks and spills immediately.
- Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Reporting

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).
- Report spills to local agencies, such as the fire department; they can assist in cleanup.
- Establish a system for tracking incidents. The system should be designed to identify the following:

  - Types and quantities (in some cases) of wastes

  - Patterns in time of occurrence (time of day/night, month, or year)

- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)

- Responsible parties

Training

- Educate employees about spill prevention and cleanup.

- Well-trained employees can reduce human errors that lead to accidental releases or spills:

  - The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.

- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.

- Train employees to recognize and report illegal dumping incidents.

Other Considerations (Limitations and Regulations)

- A Spill Prevention Control and Countermeasure Plan (SPCC) is required for facilities that are subject to the oil pollution regulations specified in Part 112 of Title 40 of the Code of Federal Regulations or if they have a storage capacity of 10,000 gallons or more of petroleum. (Health and Safety Code 6.67)

- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.

- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Requirements

Costs (including capital and operation & maintenance)

- Will vary depending on the size of the facility and the necessary controls.

- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

Maintenance (including administrative and staffing)

- This BMP has no major administrative or staffing requirements. However, extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

Supplemental Information

Further Detail of the BMP

Reporting

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident
- Weather conditions
- Duration of the spill/leak/discharge
- Cause of the spill/leak/discharge
- Response procedures implemented
- Persons notified
- Environmental problems associated with the spill/leak/discharge

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- The date and time the inspection was performed
- Name of the inspector
- Items inspected
- Problems noted
- Corrective action required
- Date corrective action was taken

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

Aboveground Tank Leak and Spill Control

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from

tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)
- External corrosion and structural failure
- Spills and overfills due to operator error
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.

- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.
- Periodically conduct integrity testing by a qualified professional.

Vehicle Leak and Spill Control

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.

- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:
  - Cover fueling area if possible.
  - Use a perimeter drain or slope pavement inward with drainage to a sump.
  - Pave fueling area with concrete rather than asphalt.
- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage "topping-off' of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use adsorbent materials on small spills and general cleaning rather than hosing down the area. Remove the adsorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

Industrial Spill Prevention Response

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities. The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department)
- Develop procedures to prevent/mitigate spills to storm drain systems
- Identify responsible departments
- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures
- Address spills at municipal facilities, as well as public areas

- Provide training concerning spill prevention, response and cleanup to all appropriate personnel

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net/

Vehicle & Equipment Fueling SC-20

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

Spills and leaks that occur during vehicle and equipment fueling can contribute hydrocarbons, oil and grease, as well as heavy metals to stormwater runoff. Implementing the following management practices can help prevent fuel spills and leaks.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Use properly maintained off-site fueling stations whenever possible. These businesses are better equipped to handle fuel and spills properly.
- Educate employees about pollution prevention measures and goals.
- Focus pollution prevention activities on containment of spills and leaks, most of which may occur during liquid transfers.

Suggested Protocols

General

- "Spot clean" leaks and drips routinely. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

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- Manage materials and waste to reduce adverse impacts on stormwater quality.
- Label drains within the facility boundary, by paint/stencil (or equivalent), to indicate whether they flow to an oil/water separator, directly to the sewer, or to a storm drain. Labels are not necessary for plumbing fixtures directly connected to the sanitary sewer.
- Post signs to remind employees and customers not to top off the fuel tank when filling and signs that ban customers and employees from changing engine oil or other fluids at that location.
- Report leaking vehicles to fleet maintenance.
- Install inlet catch basin equipped with a small sedimentation basin or grit chamber to remove large particles from stormwater in highly impervious areas.
- Ensure the following safeguards are in place:
  - Overflow protection devices on tank systems to warn the operator to automatically shutdown transfer pumps when the tank reaches full capacity.
  - Protective guards around tanks and piping to prevent vehicle or forklift damage.
  - Clear tagging or labeling of all valves to reduce human error.

Fuel Dispensing Areas

- Maintain clean fuel-dispensing areas using dry cleanup methods such as sweeping for removal of litter and debris, or use of rags and absorbents for leaks and spills.
- If you periodically clean by washing, place a temporary plug in the downstream drain and pump out the accumulated water. Properly dispose the water. Note: permission from the local sewering agency must be obtained before discharging wash water to the sanitary sewer.
- Fit underground storage tanks with spill containment and overfill prevention systems meeting the requirements of Section 2635(b) of Title 23 of the California Code of Regulations.
- Fit fuel dispensing nozzles with "hold-open latches" (automatic shutoffs) except where prohibited by local fire departments.
- Post signs at the fuel dispenser or fuel island warning vehicle owners/operators against "topping off" of vehicle fuel tanks.
- Design fueling area to prevent stormwater runoff and spills.
- Cover fueling area with an overhanging roof structure or canopy so that precipitation cannot come in contact with the fueling area and use a perimeter drain or slope pavement inward with drainage to sump; pave area with concrete rather than asphalt.
- Where covering is not feasible and the fuel island is surrounded by pavement, apply a suitable sealant that protects the asphalt from spilled fuels.

- Install vapor recovery nozzles to help control drips as well as air pollution.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Cover storm drains in the vicinity during transfer.

Outdoor Waste Receptacle Area

- Spot clean leaks and drips routinely to prevent runoff of spillage.
- Minimize the possibility of stormwater pollution from outside waste receptacles by doing at least one of the following:
  - Use only watertight waste receptacle(s) and keep the lid(s) closed.
  - Grade and pave the waste receptacle area to prevent run-on of stormwater.
  - Install a roof over the waste receptacle area.
  - Install a low containment berm around the waste receptacle area.
  - Use and maintain drip pans under waste receptacles.
- Post "no littering" signs.

Air/Water Supply Area

- Minimize the possibility of stormwater pollution from air/water supply areas by doing at least one of the following:
  - Spot clean leaks and drips routinely to prevent runoff of spillage.
  - Grade and pave the air/water supply area to prevent run-on of stormwater.
  - Install a roof over the air/water supply area.
  - Install a low containment berm around the air/water supply area.

Inspection

- Aboveground Tank Leak and Spill Control:
  - Check for external corrosion and structural failure.
  - Check for spills and overfills due to operator error.
  - Check for failure of piping system.
  - Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.
  - Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.

- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Periodically, integrity testing should be conducted by a qualified professional.

- Inspect and clean, if necessary, storm drain inlets and catch basins within the facility boundary before October 1 each year.

Training

- Train all employees upon hiring and annually thereafter on proper methods for handling and disposing of waste. Make sure that all employees understand stormwater discharge prohibitions, wastewater discharge requirements, and these best management practices.
- Train employees on proper fueling and cleanup procedures.
- Use a training log or similar method to document training.
- Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Use adsorbent materials on small spills and general cleaning rather than hosing down the area. Remove the adsorbent materials promptly.
- Store portable absorbent booms (long flexible shafts or barriers made of absorbent material) in unbermed fueling areas.
- Report spills promptly.
- If a dead-end sump is not used to collect spills, install an oil/water separator.

Other Considerations

- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.

Requirements

Costs

- The retrofitting of existing fueling areas to minimize stormwater exposure or spill runoff can be expensive. Good design must occur during the initial installation.
- Extruded curb along the "upstream" side of the fueling area to prevent stormwater run-on is of modest cost.

Maintenance

- Clean oil/water separators at appropriate intervals.

- Keep ample supplies of spill cleanup materials on-site.
- Inspect fueling areas and storage tanks on a regular schedule.

Supplemental Information

Design Considerations

Designing New Installations

The elements listed below should be included in the design and construction of new or substantially remodeled facilities.

Fuel Dispensing Areas

- Fuel dispensing areas must be paved with Portland cement concrete (or, equivalent smooth impervious surface), with a 2 to 4% slope to prevent ponding, and must be separated from the rest of the site by a grade break that prevents run-on of stormwater to the extent practicable. The fuel dispensing area is defined as extending 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus 1 foot, whichever is less. The paving around the fuel dispensing area may exceed the minimum dimensions of the "fuel dispensing area" stated above.
- The fuel dispensing area must be covered, and the cover's minimum dimensions must be equal to or greater than the area within the grade break or the fuel dispensing area, as defined above. The cover must not drain onto the fuel dispensing area.
- If necessary, install and maintain an oil control device in the appropriate catch basin(s) to treat runoff from the fueling area.

Outdoor Waste Receptacle Area

- Grade and pave the outdoor waste receptacle area to prevent run-on of stormwater to the extent practicable.

Air/Water Supply Area

- Grade and pave the air/water supply area to prevent run-on of stormwater to the extent practicable.

Designated Fueling Area

- If your facility has large numbers of mobile equipment working throughout the site and you currently fuel them with a mobile fuel truck, consider establishing a designated fueling area. With the exception of tracked equipment such as bulldozers and perhaps small forklifts, most vehicles should be able to travel to a designated area with little lost time. Place temporary "caps" over nearby catch basins or manhole covers so that if a spill occurs it is prevented from entering the storm drain.

Examples

The Spill Prevention Control and Countermeasure (SPCC) Plan, which is required by law for some facilities, is an effective program to reduce the number of accidental spills and minimize contamination of stormwater runoff.

The City of Palo Alto has an effective program for commercial vehicle service facilities. Many of the program's elements, including specific BMP guidance and lists of equipment suppliers, are also applicable to industrial facilities.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Best Management Practice Guide for Retail Gasoline Outlets, California Stormwater Quality Task Force. 1997.

Vehicle and Equipment Cleaning SC-21

Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Wash water from vehicle and equipment cleaning activities performed outdoors or in areas where wash water flows onto the ground can contribute toxic hydrocarbons and other organic compounds, oils and greases, nutrients, phosphates, heavy metals, and suspended solids to stormwater runoff. Use of the procedures outlined below can prevent or reduce the discharge of pollutants to stormwater during vehicle and equipment cleaning.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives

Pollution Prevention

- If possible, use properly maintained off-site commercial washing and steam cleaning businesses whenever possible. These businesses are better equipped to handle and properly dispose of the wash waters.
- Good housekeeping practices can minimize the risk of contamination from wash water discharges.

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Suggested Protocols

General

- Use biodegradable, phosphate-free detergents for washing vehicles as appropriate.
- Mark the area clearly as a wash area.
- Post signs stating that only washing is allowed in wash area.
- Provide trash container in wash area.
- Map on-site storm drain locations to avoid discharges to the storm drain system.
- Emphasize the connection between the storm drain system and runoff, help reinforce that car washing activities affect local water quality through storm drain stenciling programs.

Vehicle and Equipment Cleaning

- Have all vehicle washing done in areas designed to collect and hold the wash and rinse water or effluent generated. Recycle, collect or treat wash water effluent prior to discharge to the sanitary sewer system.
- If washing/cleaning must occur on-site, consider washing vehicle equipment inside the building or on an impervious surface to control the targeted constituents by directing them to the sanitary sewer.
- If washing must occur on-site and outdoor:
  - Use designated paved wash areas. Designated wash areas must be well marked with signs indicating where and how washing must be done. This area must be covered or bermed to collect the wash water and graded to direct the wash water to a treatment or disposal facility.
  - Do not conduct oil changes and other engine maintenance in the designated washing area. Perform these activities in a place designated for oil change and maintenance activities.
  - Cover the wash area when not in use to prevent contact with rain water.
- Install sumps or drain lines to collect wash water for treatment.
- Use hoses with nozzles that automatically turn off when left unattended.
- Do not permit steam cleaning wash water to enter the storm drain.
- Pressure and steam clean off-site to avoid generating runoff with high pollutant concentrations. If done on-site, no pressure cleaning and steam cleaning should be done in areas designated as wellhead protection areas for public water supply.

Disposal

- Consider filtering and recycling wash water.
- Discharge equipment wash water to the sanitary sewer, a holding tank, or a process treatment system, regardless of the washing method used.
- Collect all wash water from vehicle cleaning operations and (1) discharge to a sanitary sewer, holding tank, or process treatment system or (2) run through an enclosed recycling system.
- Collect and treat wash water at the facility and either recycle or discharge to the sanitary sewer system or collect and dispose of as an industrial waste.
- Discharge wash water to sanitary sewer after contacting local sewer authority to find out if pretreatment is required.

Training

- Train employees on proper cleaning and wash water disposal procedures and conduct "refresher" courses on a regular basis.
- Train staff on proper maintenance measures for the wash area.
- Train employees and contractors on proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

Spill Response and Prevention

- Keep the Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Have an emergency plan, equipment, and trained personnel ready at all times to deal immediately with major spills.
- Collect all spilled liquids and properly dispose of them.
- Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.

Other Considerations (Limitations and Regulations)

- Some municipalities may require pretreatment and monitoring of wash water discharges to the sanitary sewer.
- Steam cleaning can generate significant pollutant concentrations requiring that careful consideration be given to the environmental impacts and compliance issues related to steam cleaning.
- Most car washing best management practices are inexpensive, and rely more on good housekeeping practices (where vehicles are washed, planning for the collection of wash water) than on expensive technology. However, the construction of a specialized area for vehicle washing can be expensive. Also, for facilities that cannot recycle their wash water, the cost of pre-treating wash water through either structural practices or planning for

collection and hauling of contaminated water to sewage treatment plants can be cost-prohibitive.

Requirements

Costs

- Capital costs vary as follows depending on measures implemented:
  - Low cost ($2000-5,000) for berm construction
  - Medium cost ($10,000-30,000) for plumbing modifications (including re-routing discharge to sanitary sewer and installing simple sump)
  - High cost ($60,000-200,000) for on-site treatment and recycling
- O&M costs increase with increasing capital investment.

Maintenance

- Perform berm repair and patching.
- Sweep washing areas frequently to remove solid debris.
- Inspect and maintain sumps, oil/water separators, and on-site treatment/recycling units.

Supplemental Information

Design Considerations

Designated Cleaning Areas

- Washing operations outside should be conducted in a designated wash area having the following characteristics:
  - Paved with Portland cement concrete
  - Covered and bermed to prevent contact with stormwater and contain wash water
  - Sloped for wash water collections
  - Discharges wash water to the sanitary or recycle treatment process waste sewer, or to a dead-end sump
  - Equipped with an oil/water separator if necessary

Examples

The City of Palo Alto has an effective program for commercial vehicle service facilities. Many of the program's elements, including specific BMP guidance and lists of equipment suppliers, are applicable to industrial vehicle service facilities.

The U.S. Postal Service in West Sacramento has a new vehicle wash system that collects, filters, and recycles wash water.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

Vehicle and Equipment Repair SC-22

Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Vehicle or equipment maintenance and repair are potentially significant sources of stormwater pollution, due to use of harmful materials and wastes during maintenance and repair processes. Engine repair and service (e.g., parts cleaning), replacement of fluids (e.g., oil change), and out door equipment storage and parking (leaking vehicles) can impact water quality if stormwater runoff from areas with these activities becomes polluted by a variety of contaminants. Implementation of the following activities will prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment maintenance and repair activities.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Approach

- Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.

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- Minimize use of solvents. Clean parts without using solvents whenever possible, or use water-based solvents for cleaning.
- Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.

Suggested Protocols

General

- Move maintenance and repair activities indoors whenever feasible.
- Store idle equipment under cover
- Use a vehicle maintenance area designed to prevent stormwater pollution - minimize contact of stormwater with outside operations through berming and appropriate drainage routing.
- Avoid hosing down your work areas. If work areas are washed, collect and direct wash water to sanitary sewer. Use dry sweeping if possible.
- Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- Post signs at sinks to remind employees not to pour wastes down drains.
- Clean yard storm drain inlets(s) regularly and especially after large storms.
- Do not pour materials down storm drains.
- Cover the work area to limit exposure to rain.
- Place curbs around the immediate boundaries of process equipment.
- Build a shed or temporary roof over areas where parked cars await repair or salvage, especially wrecked vehicles. Build a roof over vehicles kept for parts.

Material and Waste Handling

- Designate a special area to drain and replace motor oil, coolant, and other fluids, where there are no connections to the storm drain or the sanitary sewer, and drips and spills can be easily cleaned up.
- Drain all fluids immediately from wrecked vehicles. Ensure that the drain pan or drip pan is large enough to contain drained fluids (e.g., larger pans are needed to contain antifreeze, which may gush from some vehicles).
- Do not pour liquid waste to floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
- Do not put used or leftover cleaning solutions, solvents, and automotive fluids and in the sanitary sewer.
- Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.

- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- Place oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal since municipalities prohibit or discourage disposal of these items in solid waste facilities. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters. Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater.
- Store cracked batteries in a non-leaking secondary container and dispose of properly at recycling or household hazardous waste facilities.

Maintenance and Repair Activities

- Provide a designated area for vehicle maintenance.
- Keep equipment clean; don't allow excessive build-up of oil and grease.
- Use a tarp, ground cloth, or drip pans beneath the vehicle or equipment to capture all spills and drips if temporary work is being conducted outside. Collected drips and spills must be disposed, reused, or recycled properly.
- Perform all vehicle fluid removal or changing inside or under cover if possible to prevent the run-on of stormwater and the runoff of spills:
  - Keep a drip pan under the vehicle while you unclip hoses, unscrew filters, or remove other parts. Use a drip pan under any vehicle that might leak while working on it to keep splatters or drips off the shop floor.
  - Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
  - Keep drip pans or containers under vehicles or equipment that may drip during repairs.
  - Do not change motor oil or perform equipment maintenance in non-appropriate areas.
- Drain oil and other fluids first if the vehicle or equipment is to be stored outdoors.
- Monitor parked vehicles closely for leaks. Pans should be placed under any leaks to collect the fluids for proper disposal or recycling.
- Use one of the following for lubricating vehicle-trailer coupling:
  - Adhesive lubricant
  - Plastic plates
  - Fifth wheels with plastic inserts
  - On-Board lubricating system

Parts Cleaning

- Mechanics should clean vehicle parts without using liquid cleaners wherever possible to reduce waste.

- Steam cleaning and pressure washing may be used instead of solvent parts cleaning. The wastewater generated from steam cleaning must be discharged to an on-site oil water separator that is connected to a sanitary sewer or blind sump. Non-caustic detergents should be used instead of caustic cleaning agents, detergent-based or water-based cleaning systems in place of organic solvent degreasers, and non-chlorinated solvent in place of chlorinated organic solvents for parts cleaning. Refer to SC21 for more information on steam cleaning.

Inspection

- Inspect vehicles and equipment for leaks regularly and repair immediately.

- Make sure incoming vehicles are checked for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site.

Training

- Train employees and contractors in the proper handling and disposal of engine fluids and waste materials.

- Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures (You can use reusable cloth rags to clean up small drips and spills instead of disposables; these can be washed by a permitted industrial laundry. Do not clean them at home or at a coin-operated laundry business). Employees should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

- Use a training log or similar method to document training.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.

- Place an adequate stockpile of spill cleanup materials where it will be readily accessible.

- Clean leaks, drips, and other spills with as little water as possible. Use rags for small spills, a damp mop for general cleanup, and dry absorbent material for larger spills. Use the following three-step method for cleaning floors:

  - Clean spills with rags or other absorbent materials

  - Sweep floor using dry absorbent material

  - Mop the floor. Mop water may be discharged to the sanitary sewer via a toilet or sink.

- Remove the adsorbent materials promptly and dispose of properly when using adsorbent materials on small spills.

Other Considerations (Limitations and Regulations)

- Space and time limitations may preclude all work from being conducted indoors.
- It may not be possible to contain and clean up spills from vehicles/equipment brought on-site after working hours.
- Drain pans (usually 1 ft. x 1 ft.) are generally too small to contain antifreeze, so drip pans (3 ft. x 3 ft.) may have to be purchased or fabricated.
- Dry floor cleaning methods may not be sufficient for some spills. Use three-step method instead.
- Identification of engine leaks may require some use of solvents.
- Installation of structural treatment practices for pretreatment of wastewater discharges can be expensive.
- Prices for recycled materials and fluids may be higher than those of non-recycled materials.
- Some facilities may be limited by a lack of providers of recycled materials, and by the absence of businesses to provide services such as hazardous waste removal, structural treatment practice maintenance, or solvent equipment and solvent recycling.

Requirements

Costs

- Costs should be low, but will vary depending on the size of the facility.

Maintenance

- For facilities responsible for pre-treating their wastewater prior to discharging, the proper functioning of structural treatment practices is an important maintenance consideration. Routine cleanout of oil and grease is required for the devices to maintain their effectiveness, usually at least once a month. During periods of heavy rainfall, cleanout is required more often to ensure pollutants are not washed through the trap. Sediment removal is also required on a regular basis to keep the device working efficiently.
- It is important to sweep the maintenance area weekly, if it is paved, to collect loose particles, and wipe up spills with rags and other absorbent material immediately. Do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, 1,1,1-trichloroethane or methylene chloride. Many of these cleaners are harmful and must be disposed of as a hazardous waste. Cleaning without using liquid cleaners (e.g., wire brush) whenever possible reduces waste. Prevent spills and drips of solvents and cleansers to the shop floor. Do all liquid cleaning at a centralized station so the solvents and residues stay in one area. Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for reuse.

Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents.

- Clean parts without using liquid cleaners whenever possible to reduce waste.
- Prevent spills and drips of solvents and cleansers to the shop floor.
- Do all liquid cleaning at a centralized station so the solvents and residues stay in one area.
- Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for reuse.

Recycling

Separating wastes allows for easier recycling and may reduce treatment costs. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents (e.g., 1,1,1-trichloroethane) separate from non-chlorinated solvents (e.g., kerosene and mineral spirits).

Many products made of recycled (i.e., refined or purified) materials are available. Engine oil, transmission fluid, antifreeze, and hydraulic fluid are available in recycled form. Buying recycled products supports the market for recycled materials.

- Recycling is always preferable to disposal of unwanted materials.
- Separate wastes for easier recycling. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents separate from non-chlorinated solvents.
- Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries).
- Purchase recycled products to support the market for recycled materials.

Vehicle-Trailer Lubrication

Fifth-wheel bearings on trucks require routine lubrication. Typically chassis grease is applied to the fifth-wheel bearing at rates that result in grease dripping off of the bearing into the environment. To address this concern the following options are available:

- Use adhesive lubricant. Follow manufacturer's label regarding the use of adhesive lubricant for truck fifth-wheels. Typically this means applying no more than 6 oz. of grease. No visible extrusion of lubricant from the fifth-wheel bearing when truck and trailer are connected should be present.
- Use plastic plates oil on fifth-wheels with plastic inserts.
- Use on-board truck or on-board trailer lubrication system. If these systems apply lube thinner than National Grease Lubrication Institute #2, equipment for collection of used lubricant is needed to prevent excess lubricant from dripping off the truck.

Safer Alternatives

If possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous material:

- Use non-caustic detergents instead of caustic cleaning for parts cleaning.
- Use detergent-based or water-based cleaning systems in place of organic solvent degreasers. Wash water may require treatment before it can be discharged to the sewer.
- Replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check list of active ingredients to see whether it contains chlorinated solvents.
- Choose cleaning agents that can be recycled.

Examples

- Pick N Pull Auto Dismantlers in Rancho Cordova drains all fluids from automobiles before they enter the yard.
- Ecology Auto Wrecking in Rialto is surrounded by a steel plate/concrete fence and has a completely paved lot that is graded to a central low point. Collected stormwater is channeled through an underground drainage system of clarifiers and then stored in a 60,000 gallon UST before being processed through a filter system. In addition, the work area is covered, ventilated and has an additional sump. Vehicle fluids are drained in this area and segregated for recycling.
- All Auto Parts, Fontana, has a complete water recycling system in a 10,000 square foot concrete slab surrounded by a curb that contains all the runoff and sends it to the recycling system. All receiving, dismantling, and shipping occur on the slab.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/E

Vehicle and Equipment Repair SC-22

Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Vehicle or equipment maintenance and repair are potentially significant sources of stormwater pollution, due to use of harmful materials and wastes during maintenance and repair processes. Engine repair and service (e.g., parts cleaning), replacement of fluids (e.g., oil change), and out door equipment storage and parking (leaking vehicles) can impact water quality if stormwater runoff from areas with these activities becomes polluted by a variety of contaminants. Implementation of the following activities will prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment maintenance and repair activities.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Approach

- Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.

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- Minimize use of solvents. Clean parts without using solvents whenever possible, or use water-based solvents for cleaning.
- Recycle used motor oil, diesel oil, and other vehicle fluids and parts whenever possible.

Suggested Protocols

General

- Move maintenance and repair activities indoors whenever feasible.
- Store idle equipment under cover
- Use a vehicle maintenance area designed to prevent stormwater pollution - minimize contact of stormwater with outside operations through berming and appropriate drainage routing.
- Avoid hosing down your work areas. If work areas are washed, collect and direct wash water to sanitary sewer. Use dry sweeping if possible.
- Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- Post signs at sinks to remind employees not to pour wastes down drains.
- Clean yard storm drain inlets(s) regularly and especially after large storms.
- Do not pour materials down storm drains.
- Cover the work area to limit exposure to rain.
- Place curbs around the immediate boundaries of process equipment.
- Build a shed or temporary roof over areas where parked cars await repair or salvage, especially wrecked vehicles. Build a roof over vehicles kept for parts.

Material and Waste Handling

- Designate a special area to drain and replace motor oil, coolant, and other fluids, where there are no connections to the storm drain or the sanitary sewer, and drips and spills can be easily cleaned up.
- Drain all fluids immediately from wrecked vehicles. Ensure that the drain pan or drip pan is large enough to contain drained fluids (e.g., larger pans are needed to contain antifreeze, which may gush from some vehicles).
- Do not pour liquid waste to floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
- Do not put used or leftover cleaning solutions, solvents, and automotive fluids and in the sanitary sewer.
- Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.

- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
- Place oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal since municipalities prohibit or discourage disposal of these items in solid waste facilities. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters. Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater.
- Store cracked batteries in a non-leaking secondary container and dispose of properly at recycling or household hazardous waste facilities.

Maintenance and Repair Activities

- Provide a designated area for vehicle maintenance.
- Keep equipment clean; don't allow excessive build-up of oil and grease.
- Use a tarp, ground cloth, or drip pans beneath the vehicle or equipment to capture all spills and drips if temporary work is being conducted outside. Collected drips and spills must be disposed, reused, or recycled properly.
- Perform all vehicle fluid removal or changing inside or under cover if possible to prevent the run-on of stormwater and the runoff of spills:
  - Keep a drip pan under the vehicle while you unclip hoses, unscrew filters, or remove other parts. Use a drip pan under any vehicle that might leak while working on it to keep splatters or drips off the shop floor.
  - Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.
  - Keep drip pans or containers under vehicles or equipment that may drip during repairs.
  - Do not change motor oil or perform equipment maintenance in non-appropriate areas.
- Drain oil and other fluids first if the vehicle or equipment is to be stored outdoors.
- Monitor parked vehicles closely for leaks. Pans should be placed under any leaks to collect the fluids for proper disposal or recycling.
- Use one of the following for lubricating vehicle-trailer coupling:
  - Adhesive lubricant
  - Plastic plates
  - Fifth wheels with plastic inserts
  - On-Board lubricating system

Parts Cleaning

- Mechanics should clean vehicle parts without using liquid cleaners wherever possible to reduce waste.

- Steam cleaning and pressure washing may be used instead of solvent parts cleaning. The wastewater generated from steam cleaning must be discharged to an on-site oil water separator that is connected to a sanitary sewer or blind sump. Non-caustic detergents should be used instead of caustic cleaning agents, detergent-based or water-based cleaning systems in place of organic solvent degreasers, and non-chlorinated solvent in place of chlorinated organic solvents for parts cleaning. Refer to SC21 for more information on steam cleaning.

Inspection

- Inspect vehicles and equipment for leaks regularly and repair immediately.

- Make sure incoming vehicles are checked for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site.

Training

- Train employees and contractors in the proper handling and disposal of engine fluids and waste materials.

- Ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures (You can use reusable cloth rags to clean up small drips and spills instead of disposables; these can be washed by a permitted industrial laundry. Do not clean them at home or at a coin-operated laundry business). Employees should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

- Use a training log or similar method to document training.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.

- Place an adequate stockpile of spill cleanup materials where it will be readily accessible.

- Clean leaks, drips, and other spills with as little water as possible. Use rags for small spills, a damp mop for general cleanup, and dry absorbent material for larger spills. Use the following three-step method for cleaning floors:

  - Clean spills with rags or other absorbent materials

  - Sweep floor using dry absorbent material

  - Mop the floor. Mop water may be discharged to the sanitary sewer via a toilet or sink.

- Remove the adsorbent materials promptly and dispose of properly when using adsorbent materials on small spills.

Other Considerations (Limitations and Regulations)

- Space and time limitations may preclude all work from being conducted indoors.
- It may not be possible to contain and clean up spills from vehicles/equipment brought on-site after working hours.
- Drain pans (usually 1 ft. x 1 ft.) are generally too small to contain antifreeze, so drip pans (3 ft. x 3 ft.) may have to be purchased or fabricated.
- Dry floor cleaning methods may not be sufficient for some spills. Use three-step method instead.
- Identification of engine leaks may require some use of solvents.
- Installation of structural treatment practices for pretreatment of wastewater discharges can be expensive.
- Prices for recycled materials and fluids may be higher than those of non-recycled materials.
- Some facilities may be limited by a lack of providers of recycled materials, and by the absence of businesses to provide services such as hazardous waste removal, structural treatment practice maintenance, or solvent equipment and solvent recycling.

Requirements

Costs

- Costs should be low, but will vary depending on the size of the facility.

Maintenance

- For facilities responsible for pre-treating their wastewater prior to discharging, the proper functioning of structural treatment practices is an important maintenance consideration. Routine cleanout of oil and grease is required for the devices to maintain their effectiveness, usually at least once a month. During periods of heavy rainfall, cleanout is required more often to ensure pollutants are not washed through the trap. Sediment removal is also required on a regular basis to keep the device working efficiently.
- It is important to sweep the maintenance area weekly, if it is paved, to collect loose particles, and wipe up spills with rags and other absorbent material immediately. Do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, 1,1,1-trichloroethane or methylene chloride. Many of these cleaners are harmful and must be disposed of as a hazardous waste. Cleaning without using liquid cleaners (e.g., wire brush) whenever possible reduces waste. Prevent spills and drips of solvents and cleansers to the shop floor. Do all liquid cleaning at a centralized station so the solvents and residues stay in one area. Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for reuse.

Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents.

- Clean parts without using liquid cleaners whenever possible to reduce waste.
- Prevent spills and drips of solvents and cleansers to the shop floor.
- Do all liquid cleaning at a centralized station so the solvents and residues stay in one area.
- Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for reuse.

Recycling

Separating wastes allows for easier recycling and may reduce treatment costs. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents (e.g., 1,1,1-trichloroethane) separate from non-chlorinated solvents (e.g., kerosene and mineral spirits).

Many products made of recycled (i.e., refined or purified) materials are available. Engine oil, transmission fluid, antifreeze, and hydraulic fluid are available in recycled form. Buying recycled products supports the market for recycled materials.

- Recycling is always preferable to disposal of unwanted materials.
- Separate wastes for easier recycling. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents separate from non-chlorinated solvents.
- Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries).
- Purchase recycled products to support the market for recycled materials.

Vehicle-Trailer Lubrication

Fifth-wheel bearings on trucks require routine lubrication. Typically chassis grease is applied to the fifth-wheel bearing at rates that result in grease dripping off of the bearing into the environment. To address this concern the following options are available:

- Use adhesive lubricant. Follow manufacturer's label regarding the use of adhesive lubricant for truck fifth-wheels. Typically this means applying no more than 6 oz. of grease. No visible extrusion of lubricant from the fifth-wheel bearing when truck and trailer are connected should be present.
- Use plastic plates oil on fifth-wheels with plastic inserts.
- Use on-board truck or on-board trailer lubrication system. If these systems apply lube thinner than National Grease Lubrication Institute #2, equipment for collection of used lubricant is needed to prevent excess lubricant from dripping off the truck.

Safer Alternatives

If possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous material:

- Use non-caustic detergents instead of caustic cleaning for parts cleaning.
- Use detergent-based or water-based cleaning systems in place of organic solvent degreasers. Wash water may require treatment before it can be discharged to the sewer.
- Replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check list of active ingredients to see whether it contains chlorinated solvents.
- Choose cleaning agents that can be recycled.

Examples

- Pick N Pull Auto Dismantlers in Rancho Cordova drains all fluids from automobiles before they enter the yard.
- Ecology Auto Wrecking in Rialto is surrounded by a steel plate/concrete fence and has a completely paved lot that is graded to a central low point. Collected stormwater is channeled through an underground drainage system of clarifiers and then stored in a 60,000 gallon UST before being processed through a filter system. In addition, the work area is covered, ventilated and has an additional sump. Vehicle fluids are drained in this area and segregated for recycling.
- All Auto Parts, Fontana, has a complete water recycling system in a 10,000 square foot concrete slab surrounded by a curb that contains all the runoff and sends it to the recycling system. All receiving, dismantling, and shipping occur on the slab.

References and Resources

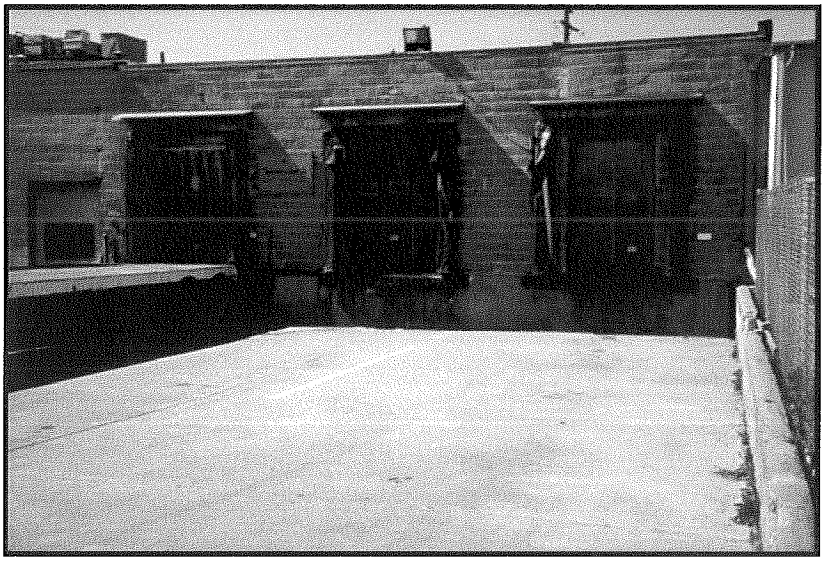
California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/E

Outdoor Loading/Unloading SC-30



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

The loading/unloading of materials usually takes place outside on docks or terminals; therefore, materials spilled, leaked, or lost during loading/unloading may collect in the soil or on other surfaces and have the potential to be carried away by stormwater runoff or when the area is cleaned. Additionally, rainfall may wash pollutants from machinery used to unload or move materials. Implementation of the following protocols will prevent or reduce the discharge of pollutants to stormwater from outdoor loading/unloading of materials.

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Keep accurate maintenance logs to evaluate materials removed and improvements made.
- Park tank trucks or delivery vehicles in designated areas so that spills or leaks can be contained.
- Limit exposure of material to rainfall whenever possible.
- Prevent stormwater run-on.
- Check equipment regularly for leaks.

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Suggested Protocols

Loading and Unloading – General Guidelines

- Develop an operations plan that describes procedures for loading and/or unloading.
- Conduct loading and unloading in dry weather if possible.
- Cover designated loading/unloading areas to reduce exposure of materials to rain.
- Consider placing a seal or door skirt between delivery vehicles and building to prevent exposure to rain.
- Design loading/unloading area to prevent stormwater run-on, which would include grading or berming the area, and position roof downspouts so they direct stormwater away from the loading/unloading areas.
- Have employees load and unload all materials and equipment in covered areas such as building overhangs at loading docks if feasible.
- Load/unload only at designated loading areas.
- Use drip pans underneath hose and pipe connections and other leak-prone spots during liquid transfer operations, and when making and breaking connections. Several drip pans should be stored in a covered location near the liquid transfer area so that they are always available, yet protected from precipitation when not in use. Drip pans can be made specifically for railroad tracks. Drip pans must be cleaned periodically, and drip collected materials must be disposed of properly.
- Pave loading areas with concrete instead of asphalt.
- Avoid placing storm drains in the area.
- Grade and/or berm the loading/unloading area to a drain that is connected to a deadend.

Inspection

- Check loading and unloading equipment regularly for leaks, including valves, pumps, flanges and connections.
- Look for dust or fumes during loading or unloading operations.

Training

- Train employees (e.g., fork lift operators) and contractors on proper spill containment and cleanup.
- Have employees trained in spill containment and cleanup present during loading/unloading.
- Train employees in proper handling techniques during liquid transfers to avoid spills.
- Make sure forklift operators are properly trained on loading and unloading procedures.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Contain leaks during transfer.
- Store and maintain appropriate spill cleanup materials in a location that is readily accessible and known to all and ensure that employees are familiar with the site's spill control plan and proper spill cleanup procedures.
- Have an emergency spill cleanup plan readily available.
- Use drip pans or comparable devices when transferring oils, solvents, and paints.

Other Considerations (Limitations and Regulations)

- Space and time limitations may preclude all transfers from being performed indoors or under cover.
- It may not be possible to conduct transfers only during dry weather.

Requirements

Costs

Costs should be low except when covering a large loading/unloading area.

Maintenance

- Conduct regular inspections and make repairs as necessary. The frequency of repairs will depend on the age of the facility.
- Check loading and unloading equipment regularly for leaks.
- Conduct regular broom dry-sweeping of area.

Supplemental Information

Further Detail of the BMP

Special Circumstances for Indoor Loading/Unloading of Materials

Loading or unloading of liquids should occur in the manufacturing building so that any spills that are not completely retained can be discharged to the sanitary sewer, treatment plant, or treated in a manner consistent with local sewer authorities and permit requirements.

- For loading and unloading tank trucks to above and below ground storage tanks, the following procedures should be used:
  - The area where the transfer takes place should be paved. If the liquid is reactive with the asphalt, Portland cement should be used to pave the area.
  - The transfer area should be designed to prevent run-on of stormwater from adjacent areas. Sloping the pad and using a curb, like a speed bump, around the uphill side of the transfer area should reduce run-on.

- The transfer area should be designed to prevent runoff of spilled liquids from the area. Sloping the area to a drain should prevent runoff. The drain should be connected to a dead-end sump or to the sanitary sewer. A positive control valve should be installed on the drain.

- For transfer from rail cars to storage tanks that must occur outside, use the following procedures:

  - Drip pans should be placed at locations where spillage may occur, such as hose connections, hose reels, and filler nozzles. Use drip pans when making and breaking connections.

  - Drip pan systems should be installed between the rails to collect spillage from tank cars.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

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The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Outdoor Container Storage SC-31

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Accidental releases of materials from above ground liquid storage tanks, drums, and dumpsters present the potential for contaminating stormwaters with many different pollutants. Tanks may store many potential stormwater runoff pollutants, such as gasoline, aviation gas, diesel fuel, ammonia, solvents, syrups, etc. Materials spilled, leaked, or lost from storage tanks may accumulate in soils or on other surfaces and be carried away by rainfall runoff. These source controls apply to containers located outside of a building used to temporarily store liquid materials and include installing safeguards against accidental releases, installing secondary containment, conducting regular inspections, and training employees in standard operating procedures and spill cleanup techniques.

Targeted Constituents

Sediment	
Nutrients	☑
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Approach

Pollution Prevention

- Educate employees about pollution prevention measures and goals
- Keep an accurate, up-to-date inventory of the materials delivered and stored on-site. Re-evaluate inventory needs and consider purchasing alternative products. Properly dispose of outdated products.
- Try to keep chemicals in their original containers, and keep them well labeled.

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- Raise the containers off the ground by use of pallet or similar method, with provisions for spill control and secondary containment.
- Contain the material in such a manner that if the container leaks or spills, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters or groundwater.
- Place drip pans or absorbent materials beneath all mounted container taps, and at all potential drip and spill locations during filling and unloading of containers. Drip pans must be cleaned periodically, and all collected liquids and soiled absorbent materials must be reused/recycled or properly disposed.
- Ensure that any underground or aboveground storage tanks shall be designed and managed in accordance with applicable regulations, be identified as a potential pollution source, have secondary containment, such as a berm or dike with an impervious surface.
- Rainfall collected in secondary containment system must not contain pollutants for discharge to storm drain system.

Container Management

- Keep containers in good condition without corrosion or leaky seams.
- Place containers in a lean-to structure or otherwise covered to keep rainfall from reaching the drums.
- Replace containers if they are deteriorating to the point where leakage is occurring. Keep all containers undercover to prevent the entry of stormwater. Employees should be made aware of the importance of keeping the containers free from leaks.
- Keep waste container drums in an area such as a service bay. Drums stored outside must be stored in a lean-to type structure, shed or walk-in container.

Storage of Hazardous Materials

- Storage of reactive, ignitable, or flammable liquids must comply with the fire and hazardous waste codes.
- Place containers in a designated area that is paved, free of cracks and gaps, and impervious in order to contain leaks and spills. The area should also be covered.
- Surround stored hazardous materials and waste with a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain and a dead-end sump should be installed in the drain.

Inspection

- Provide regular inspections:
  - Inspect storage areas regularly for leaks or spills.

Other Considerations

- Storage sheds often must meet building and fire code requirements.
- The local fire district must be consulted for limitations on clearance of roof covers over containers used to store flammable materials.
- All specific standards set by federal and state laws concerning the storage of oil and hazardous materials must be met.
- Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code.
- Storage of oil and hazardous materials must meet specific federal and state standards including:
  - Spill Prevention Control and Countermeasure Plan (SPCC) Plan
  - Secondary containment
  - Integrity and leak detection monitoring
  - Emergency preparedness plans

Requirements

Costs

- Will vary depending on the size of the facility and the necessary controls, such as berms or safeguards against accidental controls.

Maintenance

- Conduct weekly inspection.
- Sweep and clean the storage area regularly if it is paved, do not hose down the area to a storm drain.

Supplemental Information

- The most common causes of unintentional releases are:
  - Installation problems,
  - Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves),
  - External corrosion and structural failure,
  - Spills and overfills due to operator error, and
  - Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa

Curbing

Curbing is a barrier that surrounds an area of concern. Curbing is similar to containment diking in the way that it prevents spills and leaks from being released into the environment. The curbing is usually small scaled and does not contain large spills like diking. Curbing is common at many facilities in small areas where handling and transfer liquid materials occur. Curbing can redirect stormwater away from the storage area. It is useful in areas where liquid materials are transferred from one container to another. Asphalt is a common material used for curbing; however, curbing materials include earth, concrete, synthetic materials, metal, or other impenetrable materials.

- Spilled materials should be removed immediately from curbed areas to allow space for future spills.
- Curbs should have manually-controlled pump systems rather than common drainage systems for collection of spilled materials.
- The curbed area should be inspected regularly to clear clogging debris.
- Maintenance should also be conducted frequently to prevent overflow of any spilled materials as curbed areas are designed only for smaller spills.
- Curbing has the following advantages:
  - Excellent runon control,
  - Inexpensive,
  - Ease of installment,
  - Provides option to recycle materials spilled in curb areas, and
  - Common industry practice.

Examples

The "doghouse" design has been used to store small liquid containers. The roof and flooring design prevent contact with direct rain or runoff. The doghouse has two solid structural walls and two canvas covered walls. The flooring is wire mesh about secondary containment. The unit has been used successfully at Lockheed Missile and Space Company in Sunnyvale.

References and Resources

British Columbia Lake Stewardship Society. Best Management Practices to Protect Water Quality from Non-Point Source Pollution. March 2000
http://www.nalms.org/bclss/storage.html

King County Stormwater Pollution Control Manual –
http://dnr.metrokc.gov/wlr/dss/spcm.htm

Outdoor Equipment Operations SC-32

Description

Outside process equipment operations and maintenance can contaminate stormwater runoff. Activities, such as grinding, painting, coating, sanding, degreasing or parts cleaning, landfills and waste piles, solid waste treatment and disposal, are examples of process operations that can lead to contamination of stormwater runoff. Source controls for outdoor process equipment operations and maintenance include reducing the amount of waste created, enclosing or covering all or some of the equipment, installing secondary containment, and training employees.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Approach

Pollution Prevention

- Perform the activity during dry periods.
- Use non-toxic chemicals for maintenance and minimize or eliminate the use of solvents.

Targeted Constituents

Sediment	✓
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Suggested Protocols

- Consider enclosing the activity in a building and connecting the floor drains to the sanitary sewer.
- Cover the work area with a permanent roof if possible.
- Minimize contact of stormwater with outside process equipment operations through berming and drainage routing (run-on prevention). If possible, connect process equipment area to public sewer or facility wastewater treatment system. Some municipalities require that secondary containment areas be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.
- Dry clean the work area regularly.

Training

- Train employees to perform the activity during dry periods only or substituting benign materials for more toxic ones.
- Train employee and contractors in proper techniques for spill containment and cleanup. Employees should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.

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- Have employees trained in emergency spill cleanup procedures present when dangerous waste, liquid chemicals, or other wastes are delivered.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Prevent operator errors by using engineering safe guards and thus reducing accidental releases of pollutant.
- Inspect storage areas regularly for leaks or spills. Also check for structural failure, spills and overfills due to operator error, and/or failure of piping system.

Other Considerations

- Providing cover may be expensive.
- Space limitations may preclude enclosing some equipment.
- Storage sheds often must meet building and fire code requirements.

Requirements

Costs

Costs vary depending on the complexity of the operation and the amount of control necessary for stormwater pollution control.

Maintenance

- Conduct routine preventive maintenance, including checking process equipment for leaks.
- Clean the storm drain system regularly.

Supplemental Information

Further Detail of the BMP

Hydraulic/Treatment Modifications

If stormwater becomes polluted, it should be captured and treated. If you do not have your own process wastewater treatment system, consider discharging to the public sewer system. Use of the public sewer might be allowed under the following conditions:

- If the activity area is very small (less than a few hundred square feet), the local sewer authority may be willing to allow the area to remain uncovered with the drain connected to the public sewer.
- It may be possible under unusual circumstances to connect a much larger area to the public sewer, as long as the rate of stormwater discharges does not exceed the capacity of the wastewater treatment plant. The stormwater could be stored during the storm and then transferred to the public sewer when the normal flow is low, such as at night.

Industries that generate large volumes of process wastewater typically have their own treatment system and corresponding permit. These industries have the discretion to use their wastewater treatment system to treat stormwater within the constraints of their permit requirements for process treatment. It may also be possible for the industry to discharge the stormwater directly to an effluent outfall without treatment as long as the total loading of the discharged process

water and stormwater does not exceed the loading had a stormwater treatment device been used. This could be achieved by reducing the loading from the process wastewater treatment system. Check with your Regional Water Quality Control Board or local sewering agency, as this option would be subject to permit constraints and potentially regular monitoring.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net

Outdoor Storage of Raw Materials SC-33

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

Raw materials, by-products, finished products, containers, and material storage areas exposed to rain and/or runoff can pollute stormwater. Stormwater can become contaminated when materials wash off or dissolve into water or are added to runoff by spills and leaks. Improper storage of these materials can result in accidental spills and the release of materials. To prevent or reduce the discharge of pollutants to stormwater from material delivery and storage, pollution prevention and source control measures must be implemented, such as minimizing the storage of hazardous materials on-site, enclosing or covering materials, storing materials in a designated area, installing secondary containment, conducting regular inspections, preventing stormwater run-on and runoff, and training employees and subcontractors.

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Emphasize employee education for successful BMP implementation.
- Minimize inventory of raw materials.
- Keep an accurate, up-to-date inventory of the materials delivered and stored on-site.

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- Try to keep chemicals in their original containers and keep them well labeled.

Suggested Protocols

General

- Store all materials inside. If this is not feasible, then all outside storage areas should be covered with a roof and bermed or enclosed to prevent stormwater contact. At the very minimum, a temporary waterproof covering made of polyethylene, polypropylene or hypalon should be used over all materials stored outside.
- Cover and contain the stockpiles of raw materials to prevent stormwater from running into the covered piles. The covers must be in place at all times when work with the stockpiles is not occurring. (Applicable to small stockpiles only).
- Implement erosion control practices at the perimeter of your site and at any catch basins to prevent erosion of the stockpiled material off-site, if the stockpiles are so large that they cannot feasibly be covered and contained.
- Keep liquids in a designated area on a paved impervious surface within a secondary containment.
- Keep outdoor storage containers in good condition.
- Minimize stormwater run-on by enclosing the area or building a berm around it.
- Keep storage areas clean and dry.
- Slope paved areas should be sloped in a manner that minimize pooling of water on the site, particularly with materials that may leach pollutants into stormwater and/or groundwater, such as compost, logs, and wood chips. A minimum slope of 1.5% is recommended.
- Secure drums stored in an area where unauthorized persons may gain access to prevent accidental spillage, pilferage, or any unauthorized use.
- Cover wood products treated with chromated copper arsenate, ammonical copper zinc arsenate, creosote, or pentachlorophenol with tarps or store indoors.

Raw Material Containment

- Curbing should be placed along the perimeter of the area to prevent the run-on of uncontaminated stormwater from adjacent areas as well as runoff of stormwater from the stockpile areas.
- Tanks should be bermed or surrounded by a secondary containment system.
- The area inside the curb should slope to a drain. Liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Inspection

- Conduct regular inspections of storage areas so that leaks and spills are detected as soon as possible.
- Check berms, curbing, containment for repair and patching.

Training

- Train employees well in proper material storage.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.

Other Considerations

- Storage sheds often must meet building and fire code requirements. Storage of reactive, ignitable, or flammable liquids must comply with the Uniform Fire Code and the National Electric Code.
- Space limitations may preclude storing some materials indoors.
- Some municipalities require that secondary containment areas (regardless of size) be connected to the sanitary sewer, prohibiting any hard connections to the storm drain. Storage sheds often must meet building and fire code requirements.
- The local fire district must be consulted for limitations on clearance of roof covers over containers used to store flammable materials.

Requirements

Costs

Costs will vary depending on the size of the facility and the necessary controls. They should be low except where large areas may have to be covered.

Maintenance

- Accurate and up-to-date inventories should be kept of all stored materials.
- Berms and curbs may require periodic repair and patching.
- Parking lots or other surfaces near bulk materials storage areas should be swept periodically to remove debris blown or washed from storage areas.
- Sweep paved storage areas regularly for collection and disposal of loose solid materials, do not hose down the area to a storm drain or conveyance ditch.

- Keep outdoor storage areas in good condition (e.g., repair roofs, floors, etc., to limit releases to runoff).

Supplemental Information

Further Detail of the BMP

Raw Material Containment

Paved areas should be sloped in a manner that minimizes pooling of water on the site, particularly with materials that may leach pollutants into stormwater and/or groundwater, such as compost, logs, and wood chips. A minimum slope of 1.5% is recommended.

- Curbing should be placed along the perimeter of the area to prevent the run-on of uncontaminated stormwater from adjacent areas as well as runoff of stormwater from stockpile areas.
- The storm drainage system should be designed to minimize use of catch basins in the interior of the area as they tend to rapidly fill with manufacturing material.
- The area should be sloped to drain stormwater to the perimeter where it can be collected or to internal drainage alleyways where material is not stockpiled.
- If the raw material, by-product, or product is a liquid, more information for outside storage of liquids can be found under SC31, Outdoor Liquid Container Storage.

Supplemental Information

Examples

The "doghouse" design has been used to store small liquid containers. The roof and flooring design prevent contact with direct rain or runoff. The doghouse has two solid structural walls and two canvas covered walls. The flooring is wire mesh about secondary containment. The unit has been used successively at Lockheed Missile and Space Company in Sunnyvale.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

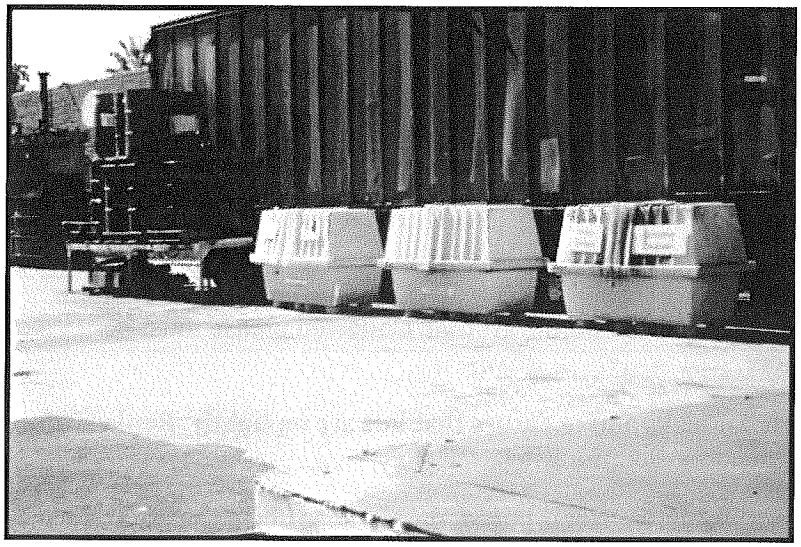
Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Waste Handling & Disposal SC-34



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Improper storage and handling of solid wastes can allow toxic compounds, oils and greases, heavy metals, nutrients, suspended solids, and other pollutants to enter stormwater runoff. The discharge of pollutants to stormwater from waste handling and disposal can be prevented and reduced by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, reuse, and recycling; and preventing run-on and runoff.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Approach

Pollution Prevention

- Accomplish reduction in the amount of waste generated using the following source controls:
  - Production planning and sequencing
  - Process or equipment modification
  - Raw material substitution or elimination
  - Loss prevention and housekeeping
  - Waste segregation and separation
  - Close loop recycling
- Establish a material tracking system to increase awareness about material usage. This may reduce spills and minimize contamination, thus reducing the amount of waste produced.
- Recycle materials whenever possible.

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Suggested Protocols

General

- Cover storage containers with leak proof lids or some other means. If waste is not in containers, cover all waste piles (plastic tarps are acceptable coverage) and prevent stormwater run-on and runoff with a berm. The waste containers or piles must be covered except when in use.
- Use drip pans or absorbent materials whenever grease containers are emptied by vacuum trucks or other means. Grease cannot be left on the ground. Collected grease must be properly disposed of as garbage.
- Check storage containers weekly for leaks and to ensure that lids are on tightly. Replace any that are leaking, corroded, or otherwise deteriorating.
- Sweep and clean the storage area regularly. If it is paved, do not hose down the area to a storm drain.
- Dispose of rinse and wash water from cleaning waste containers into a sanitary sewer if allowed by the local sewer authority. Do not discharge wash water to the street or storm drain.
- Transfer waste from damaged containers into safe containers.
- Take special care when loading or unloading wastes to minimize losses. Loading systems can be used to minimize spills and fugitive emission losses such as dust or mist. Vacuum transfer systems can minimize waste loss.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide a sufficient number of litter receptacles for the facility.
- Clean out and cover litter receptacles frequently to prevent spillage.

Waste Collection

- Keep waste collection areas clean.
- Inspect solid waste containers for structural damage regularly. Repair or replace damaged containers as necessary.
- Secure solid waste containers; containers must be closed tightly when not in use.
- Do not fill waste containers with washout water or any other liquid.
- Ensure that only appropriate solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, etc., may not be disposed of in solid waste containers (see chemical/ hazardous waste collection section below).

- Do not mix wastes; this can cause chemical reactions, make recycling impossible, and complicate disposal.

Good Housekeeping

- Use all of the product before disposing of the container.
- Keep the waste management area clean at all times by sweeping and cleaning up spills immediately.
- Use dry methods when possible (e.g., sweeping, use of absorbents) when cleaning around restaurant/food handling dumpster areas. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer.

Chemical/Hazardous Wastes

- Select designated hazardous waste collection areas on-site.
- Store hazardous materials and wastes in covered containers and protect them from vandalism.
- Place hazardous waste containers in secondary containment.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Stencil or demarcate storm drains on the facility's property with prohibitive message regarding waste disposal.

Run-on/Runoff Prevention

- Prevent stormwater run-on from entering the waste management area by enclosing the area or building a berm around the area.
- Prevent waste materials from directly contacting rain.
- Cover waste piles with temporary covering material such as reinforced tarpaulin, polyethylene, polyurethane, polypropyleneor hypalon.
- Cover the area with a permanent roof if feasible.
- Cover dumpsters to prevent rain from washing waste out of holes or cracks in the bottom of the dumpster.
- Move the activity indoor after ensuring all safety concerns such as fire hazard and ventilation are addressed.

Inspection

- Inspect and replace faulty pumps or hoses regularly to minimize the potential of releases and spills.
- Check waste management areas for leaking containers or spills.

- Repair leaking equipment including valves, lines, seals, or pumps promptly.

Training

- Train staff in pollution prevention measures and proper disposal methods.
- Train employees and contractors in proper spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.
- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Have an emergency plan, equipment and trained personnel ready at all times to deal immediately with major spills
- Collect all spilled liquids and properly dispose of them.
- Store and maintain appropriate spill cleanup materials in a location known to all near the designated wash area.
- Ensure that vehicles transporting waste have spill prevention equipment that can prevent spills during transport. Spill prevention equipment includes:
  - Vehicles equipped with baffles for liquid waste
  - Trucks with sealed gates and spill guards for solid waste

Other Considerations (Limitations and Regulations)

Hazardous waste cannot be reused or recycled; it must be disposed of by a licensed hazardous waste hauler.

Requirements

Costs

Capital and O&M costs for these programs will vary substantially depending on the size of the facility and the types of waste handled. Costs should be low if there is an inventory program in place.

Maintenance

- None except for maintaining equipment for material tracking program.

Supplemental Information

Further Detail of the BMP

Land Treatment System

Minimize runoff of polluted stormwater from land application by:

- Choosing a site where slopes are under 6%, the soil is permeable, there is a low water table, it is located away from wetlands or marshes, and there is a closed drainage system

- Avoiding application of waste to the site when it is raining or when the ground is saturated with water
- Growing vegetation on land disposal areas to stabilize soils and reduce the volume of surface water runoff from the site
- Maintaining adequate barriers between the land application site and the receiving waters (planted strips are particularly good)
- Using erosion control techniques such as mulching and matting, filter fences, straw bales, diversion terracing, and sediment basins
- Performing routine maintenance to ensure the erosion control or site stabilization measures are working

Examples

The port of Long Beach has a state-of-the-art database for identifying potential pollutant sources, documenting facility management practices, and tracking pollutants.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Solid Waste Container Best Management Practices – Fact Sheet On-Line Resources – Environmental Health and Safety. Harvard University. 2002.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Contaminated or Erodible Areas SC-40

Description

Areas within an industrial site that are bare of vegetation or are subject to activities that promote the suppression of vegetation are often subject to erosion. In addition, they may or may not be contaminated from past or current activities. If the area is temporarily bare because of construction, see SC-42, Building Repair, Remodeling, and Construction. Sites with excessive erosion or the potential for excessive erosion should consider employing the soil erosion BMPs identified in the Construction BMP Handbook. Note that this fact sheet addresses soils that are not so contaminated as to exceed hazardous waste criteria (see Title 22 California Code of Regulations for Hazardous Waste Criteria).

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

Preserve natural vegetation whenever possible. See also EC-2, Preservation of Existing Vegetation, in the Construction BMP Handbook.

Suggested Protocols

- Preserve natural vegetation.
- Analyze soil conditions.
- Re-vegetate when necessary.
- Remove contaminated soil.
- Utilize chemical stabilization when needed. See also EC-5, Soil Binders, and EC-13, Polyacrylamide, in the Construction BMP Handbook.
- Use geosynthetic membranes to control erosion if feasible. See also EC-7, Geotextiles and Mats, in the Construction BMP Handbook.

Training

Training is not a significant element of this best management practice.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

Other Considerations

- Disadvantages of preserving natural vegetation or revegetation include:
  - Requires substantial planning to preserve and maintain the existing vegetation
  - May not be cost-effective with high land costs
  - Lack of rainfall, inadequate irrigation and/or poor soils may limit the success of re-vegetated areas
- Disadvantages of chemical stabilization include:
  - Creation of impervious surfaces
  - May cause harmful effects on water quality
  - Is usually more expensive than vegetative cover

Requirements

Costs

Except for preservation of natural vegetation, each of the above solutions can be quite expensive depending upon the size of the area.

Maintenance

Maintenance should be minimal, except possibly if irrigation of vegetation is necessary.

Supplemental Information

Preserving Vegetation to Minimize Erosion

Preserving stabilized areas minimizes erosion potential, protects water quality, and provides aesthetic benefits. The most effective way to control erosion is to preserve existing vegetation. Preservation of natural vegetation provides a natural buffer zone and an opportunity for infiltration of stormwater and capture of pollutants in the soil matrix. This practice can be used as a permanent source control measure.

Vegetation preservation should be incorporated into the site. Preservation requires good site management to minimize the impact of construction when construction is underway and exposure of soils after construction. Proper maintenance is important to ensure healthy vegetation that can control erosion. Different species, soil types, and climatic conditions will require different maintenance activities such as mulching, fertilizing, liming, irrigation, pruning and weed and pest control. Maintenance should be performed regularly especially during construction phases.

The preferred approach is to leave as much native vegetation on-site as possible, thereby reducing or eliminating any erosion problem. However, assuming the site already has contaminated or erodible surface areas, there are four possible courses of action which can be taken:

- The area can be revegetated if it is not in use and therefore not subject to damage from site activities. In as much as the area is already devoid of vegetation, special measures are likely

necessary. Lack of vegetation may be due to the lack of water and/or poor soils. The latter can perhaps be solved with fertilization, or the ground may simply be too compacted from prior use. Improving soil conditions may be sufficient to support the recovery of vegetation. Use process wastewater for irrigation if possible. Finally, see the Construction BMP Handbook for further procedures on establishing vegetation.

- Chemical stabilization can be used as an alternate method in areas where temporary seeding practices cannot be used because of season or climate. It can provide immediate, effective, and inexpensive erosion control. Application rates and procedures recommended by the manufacturer should be followed as closely as possible to prevent the products from forming ponds and creating large areas where moisture cannot penetrate the soil. See also EC-5, Soil Binders, and EC-13, Polyacrylamide, in the Construction BMP Handbook for more information. Advantages of chemical stabilization include:

  - Applied easily to the surface
  - Stabilizes areas effectively
  - Provides immediate protection to soils that are in danger of erosion

- Contaminated soils can be removed, however this is a last resort and quite expensive. The level and extent of the contamination must be determined. This determination and removal must comply with State and Federal regulations, permits must be acquired and fees paid.

- Geosynthetics may be used. Geosynthetics include those materials that are designed as an impermeable barrier to contain or control large amounts of liquid or solid matter. Geosynthetics have been developed primarily for use in landfills and surface impoundments, and the technology is well established. There are two general types of geosynthetics: geomembranes (impermeable) and geotextiles (permeable). Geomembranes are composed of one of three types of impermeable materials: elastomers (rubbers), thermoplasics (plastics), or a combination of these two types of materials. See also EC-7, Geotextiles and Mats, in the Construction BMP Handbook for more information. The advantages of these materials include:

  - A variety of compounds are available
  - Sheeting is produced in a factory environment
  - Polymeric membranes are flexible
  - Installation is simple

  Disadvantages include:

  - Chemical resistance must be determined for each application
  - Seaming systems may be a weak link in the system
  - Many materials are subject to attack from biotic, mechanical, or environmental sources

Geotextiles are uncoated synthetic textile products that are not watertight. They are composed of a variety of materials, most commonly polypropylene and polyester. Geotextiles serve five basic functions:

- Filtration
- Drainage
- Separation
- Reinforcement
- Armoring

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Building & Grounds Maintenance SC-41

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	
Organics	

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.

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- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

Landscaping Activities

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.
- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- Use hand weeding where practical.

Fertilizer and Pesticide Management

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Apply pesticides only when wind speeds are low.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.

- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

Training

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.

Other Considerations

Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Cost will vary depending on the type and size of facility.
- Overall costs should be low in comparison to other BMPs.

Maintenance

Sweep paved areas regularly to collect loose particles. Wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Parking/Storage Area Maintenance SC-43

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas and storage areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook)
- Keep accurate maintenance logs to evaluate BMP implementation.

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SC-43 Parking/Storage Area Maintenance

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Discharge soapy water remaining in mop or wash buckets to the sanitary sewer through a sink, toilet, clean-out, or wash area with drain.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel, and dispose of litter in the trash.

Surface Cleaning

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Follow the procedures below if water is used to clean surfaces:
  - Block the storm drain or contain runoff.
  - Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- Follow the procedures below when cleaning heavy oily deposits:
  - Clean oily spots with absorbent materials.
  - Use a screen or filter fabric over inlet, then wash surfaces.

- Do not allow discharges to the storm drain.
- Vacuum/pump discharges to a tank or discharge to sanitary sewer.
- Appropriately dispose of spilled materials and absorbents.

Surface Repair

- Preheat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.
- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

Other Considerations

Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

SC-43 Parking/Storage Area Maintenance

Requirements

Costs

Cleaning/sweeping costs can be quite large. Construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot regularly to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities regularly to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Only use only as much water as is necessary for dust control to avoid runoff.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

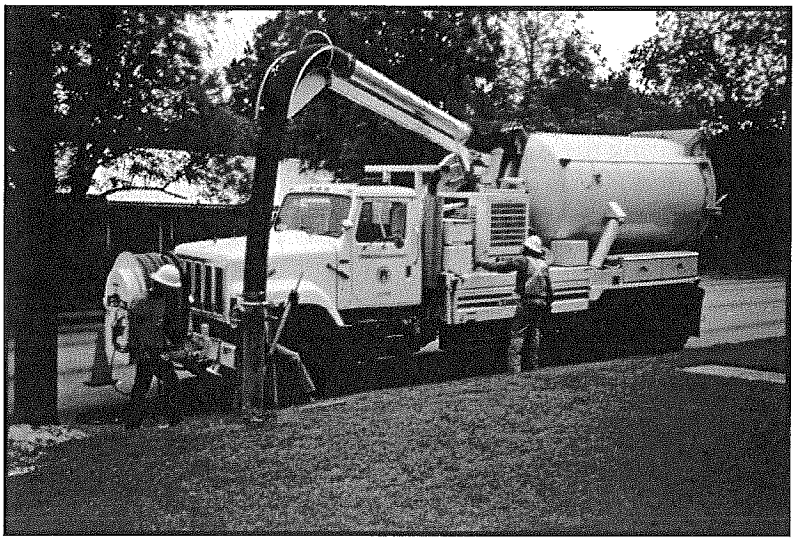
Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Drainage System Maintenance SC-44



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

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- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:
  - Purchase and installation of signs.
  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.
  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.
  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Multiple Systems TC-60

General Description

A multiple treatment system uses two or more BMPs in series. Some examples of multiple systems include: settling basin combined with a sand filter; settling basin or biofilter combined with an infiltration basin or trench; extended detention zone on a wet pond.

Inspection/Maintenance Considerations

Each of the separate treatment processes will require maintenance as described in the previous fact sheets. For example, multiple system comprises of a biofilter combined with an infiltration basin would require the inspection and maintenance considerations outlined on the fact sheet for each process.

Inspection Activities	Suggested Frequency
■ Refer to individual treatment control factsheets	As needed
Maintenance Activities	**Suggested Frequency**
■ Refer to individual treatment control factsheets	As needed

Maintenance Concerns, Objectives, and Goals

May include some of the following:

- ■ Accumulation of Metals
- ■ Aesthetics
- ■ Channelization of Flow
- ■ Clogged Outlet Structures
- ■ Endangered Species Habitat Creation
- ■ Erosion
- ■ Groundwater Contamination
- ■ Hazardous Waste
- ■ Hydraulic and Removal Efficiency
- ■ Invasive/exotic Plant Species
- ■ Mechanical Malfunction
- ■ Pollutant Breakthrough
- ■ Re-suspension of settled material
- ■ Sediment and Trash Removal
- ■ Sedimentation
- ■ Vector/Pest Control
- ■ Vegetation harvesting
- ■ Vegetation/Landscape Maintenance

Targeted Constituents

✓	Sediment	■
✓	Nutrients	●
✓	Trash	■
✓	Metals	■
✓	Bacteria	▲
✓	Oil and Grease	■
✓	Organics	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

CASQA California Stormwater Quality Association

Appendix F: BMP Observation Forms

Visual Observation Log

Date and Time of Inspection:	Report Date:
Facility Name: **Royal Gold LLC**	
WDID: WDID: **1 12I025790**	
Monthly ☐	Other_____ ☐

Weather

Antecedent Conditions (last 48 hours):	Current Weather:

NSWD Observations

Was any authorized non-stormwater discharge observed?	☐ Yes ☐ No
Was any **unauthorized** non-stormwater discharge observed?	☐ Yes ☐ No
If yes to either, identify source:	

Outdoor Industrial Equipment and Storage Area Observations

Complete Monthly BMP Inspection Report	☐ Yes ☐ No		
	Were any deficiencies or any other potential source of industrial pollutants observed?		
		DMA Identifier	Date Action Taken
Odors	☐ Yes ☐ No		
Floating Material	☐ Yes ☐ No		
Suspended Material	☐ Yes ☐ No		
Sheen	☐ Yes ☐ No		
Discolorations	☐ Yes ☐ No		
Turbidity	☐ Yes ☐ No		
If yes to any, describe:			

Outdoor Industrial Equipment and Storage Area Observations			
Complete Monthly BMP Inspection Report	☐ Yes ☐ No		
Drainage Management Area Were any deficiencies or any other potential source of industrial pollutants observed?			
DMA-1	☐ Yes ☐ No	DMA-6	☐ Yes ☐ No
DMA-2	☐ Yes ☐ No	DMA-7	☐ Yes ☐ No
DMA-3	☐ Yes ☐ No	DMA-8	☐ Yes ☐ No
DMA-4	☐ Yes ☐ No	DMA-9	☐ Yes ☐ No
DMA-5	☐ Yes ☐ No	DMA-10	☐ Yes ☐ No
If yes to any, describe and provide corrective actions:			

Exception Documentation (explanation required if inspection could not be conducted).

Inspector Information

Inspector Name:	Inspector Title:
Signature:	Date:

Part I. Inspection Information	
Date and Time of Inspection:	Date Report Written:

Monthly ☐	Other_____ ☐

Site Information		
Facility Name: Royal Gold LLC		
Facility Address: 1689 Glendale Drive, Arcata, CA		
WDID: 1 12I025790		
Photos Taken:	☐ Yes ☐ No	Photo Reference IDs:

Weather	
Estimate storm beginning: (date and time)	Estimate storm duration: (hours)
Estimate time since last runoff from any drainage area: (days or hours)	Rain gauge reading and location: (in)
Is a "Qualifying Storm Event" predicted or did one occur (i.e., discharge from site preceded by 48-hrs without discharge)? ☐ Yes ☐ No If yes, summarize forecast:	

Exception Documentation (explanation required if inspection could not be conducted).

Inspector Information	
Inspector Name:	Inspector Title:
Signature:	Date:

Part II. BMP Checklist				
BMP	Yes	No	NA	If Action Required Date Implemented
Preservation of Existing Vegetation				
Location:				
Location:				
Location:				
Location:				
Temporary Linear Sediment Barriers (Silt Fence, Fiber Rolls, Sandbag Barriers, Gravel Berms, etc.)				
Are temporary linear sediment barriers properly installed, functional and maintained?				
Are temporary linear sediment barriers free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced?				
INSPECTION OF BMPs				
Location:				
Location:				
Location:				
Location:				
Location:				
Sediment Basins, Traps, Evaporators, Bioswales				
Are basins functioning, stable and properly vegetated?				
Are basins maintained to provide the required detention (sediment and debris cleaned out)?				
Is basin infiltration occurring properly?				
Location:				
Location:				
Location:				
Location:				
Stockpiles				
Are all locations of temporary stockpiles, including soil, hazardous waste, and construction materials in approved areas?				
Are stockpiles protected from runon, runoff from adjacent areas and from winds?				
Are stockpiles located at least 15 m from concentrated flows, downstream drainage courses and storm drain inlets?				
Are covers and/or perimeter controls in place?				
Location:				
Location:				
Location:				
Location:				

Part II. BMP Checklist				
BMP	Yes	No	NA	If Action Required Date Implemented
Tracking Control				
Are points of ingress/egress to public/private roads inspected and swept and vacuumed as needed?				
Are all paved areas free of visible sediment tracking or other particulate matter?				
Location:				
Location:				
Location:				
Location:				
Wind Erosion Control				
Is dust control implemented?				
Location:				
Location:				
Location:				
Location:				
Vehicle & Equipment Fueling, Cleaning, and Maintenance				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 15 m away from downstream drainage facilities and watercourses and protected from runon and runoff?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Location:				
Location:				
Waste Management & Materials Pollution Control				
Are spills from mobile equipment fueling and maintenance properly contained and cleaned up?				
Is the site free of litter?				
Location:				
Location:				
Illicit Connection/ Discharge				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Owner/Operator been notified?				
Location:				

Part II. BMP Checklist				
BMP	Yes	No	NA	If Action Required Date Implemented
Location:				
Discharge Points				
Are discharge points and discharge flows free from visible pollutants?				
Are discharge points free of any significant sediment transport?				
Location:				
Location:				
Location:				
Location:				
Earth Dikes and Drainage Swales				
Are dikes and swales vegetated/stable and in place?				
Are dikes and swales free of accumulated debris/sediment?				
Location:				
Location:				
Location:				
Location:				
Check Dams				
Are check dams stable and in place?				
Are check dams functioning at the right height to detain water without flooding the site?				
Location:				
Location:				
Spill Prevention and Control				
Are spill response kits in place and well-marked (legible)?				
Are spill response kits fully stocked?				
Location:				
Location:				
SWMP Update				
Does the SWMP and Project Schedule adequately reflect the current site conditions and contractor operations?				
Are all BMPs shown on the water pollution control drawings installed in the proper location(s) and according to the details in the SWMP?				
Location:				
Location:				
Location:				
Location:				
General				
Are there any other potential concerns at the site?				
Location:				

Part II. BMP Checklist				
BMP	**Yes**	**No**	**NA**	**If Action Required Date Implemented**
Location:				
Location:				
Storm Water Monitoring				
Does storm water discharge directly to a water body listed in the General Permit as impaired for sediment/sedimentation or turbidity?				
Were there any BMPs not properly implemented or breaches, malfunctions, leakages or spills observed which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water?				
Were the BMPs maintained or replaced?				

Part III. Descriptions of BMP Deficiencies		
Deficiency	Repairs Implemented: **Note -** Repairs must be completed as soon as possible.	
	Repaired (Y/N)	Corrective Action Implemented
1.		
2.		
3.		
4.		

Part IV. Additional Corrective Actions Required. Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Identify BMPs that need more frequent inspection. Note if SWPPP change is required.	
Required Actions	Implementation Date

Appendix G: Industrial General Permit

Permit provided in hard copy only.
The National Pollutant Discharge Elimination System (NDPES) General Permit for Storm Water Discharges Associated with Industrial Activities
Order NPDES No. CAS000001
online link:
http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2014/wqo2014_0057_dwq_rev_mar2015.pdf

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