MOJAVE RIVER WATERSHED

Water Quality Management Plan

For:

Project Loki

PRE-SUBMITTAL REVIEW CASE NO.: PSUB21-00022

APN: 045904132, 045904123, AND 045904124

Prepared for:

Prologis

3546 Concours St., Suite 100

Ontario, CA 91764

(909)673-8727

Prepared by:

Langan Engineering and Environmental Services, Inc.

18575 Jamboree Road, Suite 150

Irvine, CA 92612

(949)561-9200

Submittal Date: 1 April 2021

Revision No. and Date: _____

Revision No. and Date: _____

Revision No. and Date: _____

Revision No. and Date: _____

Revision No. and Date: _____

Final Approval Date:______________________

Project Owner's Certification

This Mojave River Watershed Water Quality Management Plan (WQMP) has been prepared for Prologis by Langan Engineering and Environmental Services, Inc. The WQMP is intended to comply with the requirements of the City of Victorville and the Phase II Small MS4 General Permit for the Mojave River Watershed. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the Phase II Small MS4 Permit and the intent of San Bernardino County (unincorporated areas of Phelan, Oak Hills, Spring Valley Lake and Victorville) and the incorporated cities of Hesperia and Victorville and the Town of Apple Valley. Once the undersigned transfers its interest in the property, its successors in interest and the city/county/town shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity.

"I certify under a penalty of law that the provisions (implementation, operation, maintenance, and funding) of the WQMP have been accepted and that the plan will be transferred to future successors."

Project Data			
Permit/Application Number(s):	Pre-Submittal Review: PSUB21-00022	Grading Permit Number(s):	TBD
Tract/Parcel Map Number(s):	TBD	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN: 045904132, 045904123, and 045904124

Owner's Signature			
Owner Name: Emily Mandrup			
Title	N/A		
Company	Stirling Capital Investments/Lot 44 LLC		
Address	27422 Portola Parkway, Suite 300		
Email	emily@ecm.llc		
Telephone #	(949)462-0909		
Signature		Date	

Preparer's Certification

Project Data			
Permit/Application Number(s):	Pre-Submittal Review: PSUB21-00022	Grading Permit Number(s):	TBD
Tract/Parcel Map Number(s):	TBD	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN: 045904132, 045904123, and 045904124

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan were prepared under my oversight and meet the requirements of the California State Water Resources Control Board Order No. 2013-0001-DWQ.

Engineer: Michael Golias		PE Stamp Below
Title	P.E.	
Company	Langan	
Address	18575 Jamboree Rd, Suite 150, Irvine, CA 92612	
Email	mgolias@langan.com	
Telephone #	(949)561-9200	
Signature		
Date		

Table of Contents

Forms

Section I – Introduction

This WQMP template has been prepared specifically for the Phase II Small MS4 General Permit in the Mojave River Watershed. This location is within the jurisdiction of the Lahontan Regional Water Quality Control Board (LRWQCB). This document should not be confused with the WQMP template for the Santa Ana Phase I area of San Bernardino County.

WQMP preparers must refer to the MS4 Permit for the Mojave Watershed WQMP template and Technical Guidance (TGD) document found at: http://cms.sbcounty.gov/dpw/Land/NPDES.aspx to find pertinent arid region and Mojave River Watershed specific references and requirements.

Section 1 Discretionary Permit(s)

Form 1-1 Project Information

Project Name	Project Loki				
Project Owner Contact Name:	Emily Mandrup				
Mailing Address: 27422 Portola Parkway, Suite 300, Foothill Ranch, CA 92610	E-mail Address:	emily@ecm.llc		Telephone:	8189195336
Permit/Application Number(s):	Pre-Submittal Review: PSUB21-00022	Tract/Parcel Map Number(s):	APN: 045904132, 045904123, and 045904124		
Additional Information/ Comments:					
Description of Project:	The project is a new development of an industrial istribution warehouse facility located on the southeast corner of Momentum Road and Gateway Drive, within Southern California Logistics Airport (SCLA) specific plan in the City of Victorville, California. The proposed building is approximately 1,080,308 square feet in size on approximately 71.4 acres of vacant land and will require a WQMP. All on-site runoff will be collected by catch basins and conveyed to the infiltration/detention basins and underground chambers on south and north side of the project site for treatment. The design captured volume will infiltrate through the bottom of the basin. Higher volumes will overflow off-site.				
Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.					

Section 2 Project Description

2.1 Project Information

The WQMP shall provide the information listed below. The information provided for Conceptual/ Preliminary WQMP should give sufficient detail to identify the major proposed site design and LID BMPs and other anticipated water quality features that impact site planning. Final Project WQMP must specifically identify all BMP incorporated into the final site design and provide other detailed information as described herein.

The purpose of this information is to help determine the applicable development category, pollutants of concern, watershed description, and long term maintenance responsibilities for the project, and any applicable water quality credits. This information will be used in conjunction with the information in Section 3, Site Description, to establish the performance criteria and to select the LID BMP or other BMP for the project or other alternative programs that the project will participate in, which are described in Section 4.

2.1.1 Project Sizing Categorization

If the Project is greater than 5,000 square feet, and not on the excluded list as found on Section 1.4 of the TGD, the Project is a Regulated Development Project.

If the Project is creating and/or replacing greater than 2,500 square feet but less than 5,000 square feet of impervious surface area, then it is considered a Site Design Only project. This criterion is applicable to all development types including detached single family homes that create and/or replace greater than 2,500 square feet of impervious area and are not part of a larger plan of development.

Form 2.1-1 Description of Proposed Project			
1 Regulated Development Project Category (Select all that apply):			
☒ #1 New development involving the creation of 5,000 ft² or more of impervious surface collectively over entire site	☐ #2 Significant re-development involving the addition or replacement of 5,000 ft² or more of impervious surface on an already developed site	☐ #3 Road Project – any road, sidewalk, or bicycle lane project that creates greater than 5,000 square feet of contiguous impervious surface	☐ #4 LUPs – linear underground/overhead projects that has a discrete location with 5,000 sq. ft. or more new constructed impervious surface
☐ Site Design Only (Project Total Square Feet > 2,500 but < 5,000 sq.ft.) *Will require source control Site Design Measures. Use the "PCMP" Template. Do not use this WQMP Template.*			

2 Project Area (ft2):	3,110,184	3 Number of Dwelling Units:	N/A	4 SIC Code:	
5 Is Project going to be phased? Yes ☐ No ☒ *If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.*					

2.2 Property Ownership/Management

Describe the ownership/management of all portions of the project and site. State whether any infrastructure will transfer to public agencies (City, County, Caltrans, etc.) after project completion. State if a homeowners or property owners association will be formed and be responsible for the long-term maintenance of project stormwater facilities. Describe any lot-level stormwater features that will be the responsibility of individual property owners.

Form 2.2-1 Property Ownership/Management
Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:
Site owner is Stirling Capital Investments, LLC. Project developer is Prologis. The site owner and/or developer will be responsible for the long-term maintenance of project stormwater facilities. Owner Information: Emily Mandrup Stirling Capital Investments, LLC 27422 Portola Parkway, Suite 300, Foothill Ranch, CA 92610 emily@ecm.llc (818)-919-5336 Developer Information: Prologis 3546 Concours St., Suite 100 Ontario, CA 91764 (909)673-8727

2.3 Potential Stormwater Pollutants

Best Management Practices (BMP) measures for pollutant generating activities and sources shall be designed consistent with recommendations from the CASQA Stormwater BMP Handbook for New Development and Redevelopment (or an equivalent manual). Pollutant generating activities must be considered when determining the overall pollutants of concern for the Project as presented in Form 2.3-1.

Determine and describe expected stormwater pollutants of concern based on land uses and site activities (refer to Table 3-2 in the TGD for WQMP).

Form 2.3-1 Pollutants of Concern

Pollutant	Please check: E=Expected, N=Not Expected		Additional Information and Comments
Pathogens (Bacterial / Virus)	E ☐	N ☒	Pathogens are typically caused by the transport of animal or human fecal wastes from the watershed.
Nutrients - Phosphorous	E ☒	N ☐	Primary sources of nutrients in urban runoff are fertilizers and eroded soils.
Nutrients - Nitrogen	E ☒	N ☐	Primary source of nutrients in urban runoff are fertilizers and eroded soils.
Noxious Aquatic Plants	E ☐	N ☒	Noxious aquatic plants are typically from animals or vehicle transport that grow aggressively, multiply quickly without natural controls (native herbivores, soil chemistry, etc.), and adversely affect native habitats.
Sediment	E ☒	N ☐	Sediments are solid material that are eroded from the land surface.
Metals	E ☒	N ☐	The primary source of metal pollution in stormwater is typically commercially available metals and metal products, as well as emissions from brake pad and tire tread wear associated with driving.
Oil and Grease	E ☒	N ☐	Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids.
Trash/Debris	E ☒	N ☐	Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic matter (such as leaves, grass cuttings, and food waste) are general waste from humans or animals.
Pesticides / Herbicides	E ☒	N ☐	Pesticides and herbicides can be washed off urban landscapes during storm events.
Organic Compounds	E ☒	N ☐	Sources of organic compounds may include waste handling areas and vehicle or landscape maintenance areas.
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	

Section 3 Site and Watershed Description

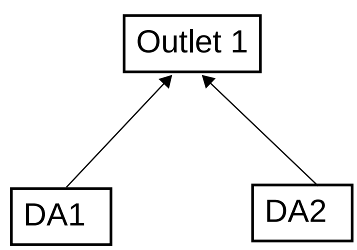
Describe the project site conditions that will facilitate the selection of BMPs through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and sub-watershed Drainage Management Areas (DMAs)) is conveyed to the site outlet(s). Refer to Section 3.2 in the TGD for WQMP. The form below is provided as an example. Then complete Forms 3.2 and 3.3 for each DA on the project site. ***If the project has more than one drainage area for stormwater management, then complete additional versions of these forms for each DA / outlet. A map presenting the DMAs must be included as an appendix to the WQMP document.***

Form 3-1 Site Location and Hydrologic Features

Site coordinates *take GPS measurement at approximate center of site*	Latitude 34°35'27.0"N	Longitude 117°23'48.6"W	Thomas Bros Map page

1 San Bernardino County climatic region: ☒ Desert

2 Does the site have more than one drainage area (DA): Yes☒ No☐ *If no, proceed to Form 3-2. If yes, then use this form to show a conceptual schematic describing DMAs and hydrologic feature connecting DMAs to the site outlet(s). An example is provided below that can be modified for proposed project or a drawing clearly showing DMA and flow routing may be attached*



Conveyance	Briefly describe on-site drainage features to convey runoff that is not retained within a DMA
DA1 DMA C flows to DA1 DMA A	*Ex. Bioretention overflow to vegetated bioswale with 4' bottom width, 5:1 side slopes and bed slope of 0.01. Conveys runoff for 1000' through DMA 1 to existing catch basin on SE corner of property*
DA1 DMA A to Outlet 1	Runoff from the west side of the project site (DA1) will be directed to the proposed infiltration basins on the north side of the project site. Higher volumes will overflow off-site.
DA1 DMA B to Outlet 1	Runoff from the east side of the project site (DA2) will be directed to the proposed infiltration basins on the north side of the project site. Higher volumes will overflow off-site.
DA2 to Outlet 2	N/A

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1

For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA A	DMA B	DMA C	DMA D
1 DMA drainage area (ft^2)	251,341	N/A	N/A	N/A
2 Existing site impervious area (ft^2)	0	0	0	0
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	AMC I	AMC I	AMC I	AMC I
4 Hydrologic soil group *Refer to County Hydrology Manual Addendum for Arid Regions – http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_addendum.pdf*	C	C	C	C
5 Longest flowpath length (ft)	739	3,197	1,324	808
6 Longest flowpath slope (ft/ft)	0.0067	0.0044	0.006	0.0074
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*	Open Brush	Open Brush	Open Brush	Open Brush
8 Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50%* ***Attach photos of site to support rating***	Poor	Poor	Poor	Poor

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1 (use only as needed for additional DMA w/in DA 1)

For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA E	DMA F	DMA G	DMA H
1 DMA drainage area (ft²)	169,013	95,832	76,666	
2 Existing site impervious area (ft²)	0	0	0	
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	AMC I	AMC I	AMC I	
4 Hydrologic soil group *County Hydrology Manual Addendum for Arid Regions – http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_addendum.pdf*	C	C	C	
5 Longest flowpath length (ft)	795	249	357	
6 Longest flowpath slope (ft/ft)	0.01	0.008	0.0028	
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*	Open Brush	Open Brush	Open Brush	
8 Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating*	Poor	Poor	Poor	

Form 3-3 Watershed Description for Drainage Area	
Receiving waters Refer to SWRCB site: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml	Mojave River Lahontan Region 6
Applicable TMDLs *http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml*	None
303(d) listed impairments *http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml*	Mojave River Upper Narrows to Lower Narrows Fluoride, Sulfates, and Total Dissolved Solids
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool –* *http://sbcounty.permitrack.com/WAP*	
Hydromodification Assessment	☐ Yes *Complete Hydromodification Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-9 in submittal* ☒ No

Section 4 Best Management Practices (BMP)

4.1 Source Control BMPs and Site Design BMP Measures

The information and data in this section are required for both Regulated Development and Site Design Only Projects. Source Control BMPs and Site Design BMP Measures are the basis of site-specific pollution management.

4.1.1 Source Control BMPs

Non-structural and structural source control BMP are required to be incorporated into all new development and significant redevelopment projects. Form 4.1-1 and 4.1-2 are used to describe specific source control BMPs used in the WQMP or to explain why a certain BMP is not applicable. Table 7-3 of the TGD for WQMP provides a list of applicable source control BMP for projects with specific types of potential pollutant sources or activities. The source control BMP in this table must be implemented for projects with these specific types of potential pollutant sources or activities.

The preparers of this WQMP have reviewed the source control BMP requirements for new development and significant redevelopment projects. The preparers have also reviewed the specific BMP required for project as specified in Forms 4.1-1 and 4.1-2. All applicable non-structural and structural source control BMP shall be implemented in the project.

The identified list of source control BMPs correspond to the CASQA Stormwater BMP Handbook for New Development and Redevelopment.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N1	Education of Property Owners, Tenants and Occupants on Stormwater BMPs	☒	☐	General information will be provided to the owner on housekeeping practices that contribute to the protection of storm water. The property owners will be familiar with the contents of this document and the BMPs used on the site. The owners will provide education materials to tenants (if applicable) on BMPs and housekeeping practices that contribute to the protection of storm water
N2	Activity Restrictions	☒	☐	The property owner shall control the discharge of the stormwater pollutants from this site through activity restrictions. Restrctions shall be provided to all new occupants, or other mechanism upon first occupancy of the lease space and annually thereafter. Enforcement of activity restriction shall be on going during the operation of the project site.
N3	Landscape Management BMPs	☒	☐	The property owner and landscape maintenance contractors will practive on going landscape maintenance BMPs consistent with applicable local or ordinances and will regular inspect the irrigation system for sign of erosion or sediment debris buildup and clean / repair as needed.
N4	BMP Maintenance	☒	☐	The City of Victorville will maintain post construction public BMPs consistent with the O&M plan described in section 5 of this document (Form 5-1). The property owner shall maintain BMPs on lot.
N5	Title 22 CCR Compliance (How development will comply)	☒	☐	Storage of hazardous materials or waste on site must comply with all Title 22 CCR regulations.
N6	Local Water Quality Ordinances	☒	☐	The owner shall comply with the City of VIctorville's Stormwater Ordinance through the implementation of BMPs.
N7	Spill Contingency Plan	☒	☐	Building operators shall prepare specific plans based on material onsite for the cleanup of spills. Plans shall mandate stock piling of cleanup materials, notification of agencies, disposal, documentation, etc. Storage shall comply with Hazmat Regulations and ny required contingency plans.

Form 4.1-1 Non-Structural Source Control BMPs				
N8	Underground Storage Tank Compliance	☐	☒	
N9	Hazardous Materials Disclosure Compliance	☐	☒	

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One: Included	Check One: Not Applicable	Describe BMP Implementation OR, if not applicable, state reason
N10	Uniform Fire Code Implementation	☒	☐	The site shall conform to the building code requirements for fire safety implementation and all fire code requirements, regardless of product stored.
N11	Litter/Debris Control Program	☒	☐	The owner shall be responsible for trash and litter to be swept from the site and dumped into a City approved dumpster with lids. The owner shall contract with the City of Victorville or local trash collector to empty dumpsters on a weekly basis. Additional ground maintenance personnel shall police the grounds for any litter.
N12	Employee Training	☒	☐	The owner will ensure and familiar with onsite BMP's and necessary maintenance required by the City. Owner will check with the City and county at least once a year to obtain new updated educational materials and provide these materials to tenants (if applicable).
N13	Housekeeping of Loading Docks	☒	☐	Loading docks should be kept in a clean and orderly condition through a regular program os sweeping and litter control and immediate cleanup of spills and broken containers. Cleanup procedures should minimize or eliminate the use of water.
N14	Catch Basin Inspection Program	☒	☐	Catch basins shall be inspected visually on a monthly basis; the entire storm drain system shall be inspected and cleaned prior ro the start of the rainy season by the City of Victorville.
N15	Vacuum Sweeping of Private Streets and Parking Lots	☒	☐	Streets and parking lots are required to be swept on a regular frequency. All paved areas of business shall be swept prior to the start of the rainy season.
N16	Other Non-structural Measures for Public Agency Projects	☐	☒	Project is not classified as a public agency project.
N17	Comply with all other applicable NPDES permits	☒	☐	The developer will comply with the California statewide Construction General Permit during construction and all future occupants of the site shall comply with the requirements of the statewide General Stormwater Permit.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S1	Provide storm drain system stencilling and signage (CASQA New Development BMP Handbook SD-13)	☒	☐	All storm drain inlets shall have Stenciling illutrating an anti-dumping message.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)	☐	☒	This development does not include the storage of materials outdoors.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	☒	☐	Trash storage areas shll ba located away from storm drain inlets. All trash dumpsters/containers will be required to have a lid on at all times to prevent direct precipitation and prevent any rainfall from entering containers.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (Statewide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12)	☒	☐	Irrigation systems will be designed to each landscaped area's specific water need. Irrigation controls shall include rain-triggered shutoff devices to prevent irrigation after precipitation.
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement	☒	☐	Landscaped area shall be a minimum of 1'' to 2'' below the top of curb or walk.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)	☒	☐	Concentrated runoff pathways through landscape areas to be protected from erosion.
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)	☐	☒	No docks proposed within new development.
S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)	☐	☒	No vehicle wash areas proposed within new development.
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	No processing areas proposed witin new development.
S10	Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36)	☐	☒	Cover of enclose area that would be most significant sources of pollutants would likely contribute to the street and the storm conveyance system.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S11	Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	No wash area proposed on site.
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)	☐	☒	No fueling area proposed on site.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	☐	☒	Not a hillside project.
S14	Wash water control for food preparation areas	☐	☒	No food preparation area on site.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	☐	☒	No community car wash racks on site.

4.1.2 Site Design BMPs

As part of the planning phase of a project, the site design practices associated with new LID requirements in the Phase II Small MS4 Permit must be considered. Site design BMP measures can result in smaller Design Capture Volume (DCV) to be managed by both LID and hydromodification control BMPs by reducing runoff generation.

As is stated in the Permit, it is necessary to evaluate site conditions such as soil type(s), existing vegetation and flow paths will influence the overall site design.

Describe site design and drainage plan including:

- A narrative of site design practices utilized or rationale for not using practices
- A narrative of how site plan incorporates preventive site design practices
- Include an attached Site Plan layout which shows how preventative site design practices are included in WQMP

Refer to Section 5.2 of the TGD for WQMP for more details.

Form 4.1-3 Site Design Practices Checklist
Site Design Practices *If yes, explain how preventative site design practice is addressed in project site plan. If no, other LID BMPs must be selected to meet targets*
Minimize impervious areas: Yes ☒ No ☐ Explanation: Landscaped area increase the pervious area and reduce impervious area.
Maximize natural infiltration capacity; Including improvement and maintenance of soil: Yes ☒ No ☐ Explanation: Infiltration/detention basin system with natural soils at the bottom.
Preserve existing drainage patterns and time of concentration: Yes ☒ No ☐ Explanation: Drainage pattern will still flow from the south to the north and detain additional peak flow in infiltration basins.
Disconnect impervious areas. Including rerouting of rooftop drainage pipes to drain stormwater to storage or infiltration BMPs instead of to storm drain : Yes ☒ No ☐ Explanation: Entire site to drain to infiltration basins in lieu of direct discharge off-site.
Use of Porous Pavement.: Yes ☐ No ☒ Explanation: Porous pavement is not applicable.
Protect existing vegetation and sensitive areas: Yes ☐ No ☒ Explanation: There is no significant existing vegetation and sensitive areas to protect.
Re-vegetate disturbed areas. Including planting and preservation of drought tolerant vegetation. : Yes ☒ No ☐ Explanation: Pervious areas within proposed site to be landscaped.

Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐ Explanation: Compactions is not proposed under the bottom of underground infiltration basins.
Utilize naturalized/rock-lined drainage swales in place of underground piping or imperviously lined swales: Yes ☐ No ☒ Explanation: Not applicable.
Stake off areas that will be used for landscaping to minimize compaction during construction : Yes ☐ No ☒ Explanation: Not applicable.
Use of Rain Barrels and Cisterns, Including the use of on-site water collection systems.: Yes ☐ No ☒ Explanation: Using basin for LID devices. Rain barrels are not applicable.
Stream Setbacks. Includes a specified distance from an adjacent steam: : Yes ☐ No ☒ Explanation: No streams near the site.

It is noted that, in the Phase II Small MS4 Permit, site design elements for green roofs and vegetative swales are required. Due to the local climatology in the Mojave River Watershed, proactive measures are taken to maximize the amount of drought tolerant vegetation. It is not practical in this region to have green roofs or vegetative swales. As part of site design the project proponent should utilize locally recommended vegetation types for landscaping. Typical landscaping recommendations are found in following local references:

San Bernardino County Special Districts:

Guide to High Desert Landscaping -
http://www.specialdistricts.org/Modules/ShowDocument.aspx?documentid=795

Recommended High-Desert Plants -
http://www.specialdistricts.org/modules/showdocument.aspx?documentid=553

Mojave Water Agency:

Desert Ranch: http://www.mojavewater.org/files/desertranchgardenprototype.pdf

Summertree: http://www.mojavewater.org/files/Summertree-Native-Plant-Brochure.pdf

Thornless Garden: http://www.mojavewater.org/files/thornlessgardenprototype.pdf

Mediterranean Garden: http://www.mojavewater.org/files/mediterraneangardenprototype.pdf

Lush and Efficient Garden: http://www.mojavewater.org/files/lushandefficientgardenprototype.pdf

Alliance for Water Awareness and Conservation (AWAC) outdoor tips – http://hdawac.org/save-outdoors.html

4.2 Treatment BMPs

After implementation and design of both Source Control BMPs and Site Design BMP measures, any remaining runoff from impervious DMAs must be directed to one or more on-site, treatment BMPs (LID or biotreatment) designed to infiltrate, evaportranspire, and/or bioretain the amount of runoff specified in Permit Section E.12.e (ii)(c) Numeric Sizing Criteria for Storm Water Retention and Treatment.

4.2.1 Project Specific Hydrology Characterization

The purpose of this section of the Project WQMP is to establish targets for post-development hydrology based on performance criteria specified in Section E.12.e.ii.c and Section E.12.f of the Phase II Small MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection from hydromodification.

If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.

It is noted that in the Phase II Small MS4 Permit jurisdictions, the LID BMP Design Capture Volume criteria is based on the 2-year rain event. The hydromodification performance criterion is based on the 10-year rain event.

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), San Bernardino County requires use of the P_6 method (Form 4.2-1) For pre- and post-development hydrologic calculation, San Bernardino County requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 mi^2), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for hydromodification performance criteria.

Refer to Section 4 in the TGD for WQMP for detailed guidance and instructions.

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 1)

1 Project area DA 1 (ft^2): 3,153,744	2 Imperviousness after applying preventative site design practices (Imp%): 70	3 Runoff Coefficient (Rc): _0.49 *$R_c = 0.858(Imp\%)^{3} - 0.78(Imp\%)^{2} + 0.774(Imp\%) + 0.04$*

4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): 0.326 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

5 Compute P_6, Mean 6-hr Precipitation (inches): 0.4
*P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Desert = 1.2371)*

6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*	24-hrs ☐ 48-hrs ☒

7 Compute design capture volume, DCV (ft^3): 101,116
*DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)*
Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2

Form 4.2-2 Summary of Hydromodification Assessment (DA 1)

Is the change in post- and pre- condition flows captured on-site? : Yes ☒ No ☐
If "Yes", then complete Hydromodification assessment of site hydrology for 10yr storm event using Forms 4.2-3 through 4.2-5 and insert results below *(Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual- Addendum 1)*
If "No," then proceed to Section 4.3 BMP Selection and Sizing

Condition	Runoff Volume (ft^3)	Time of Concentration (min)	Peak Runoff (cfs)
Pre-developed	1 201,800 *Form 4.2-3 Item 12*	2 41.7 *Form 4.2-4 Item 13*	3 45.0 *Form 4.2-5 Item 10*
Post-developed	4 323,300 *Form 4.2-3 Item 13*	5 13.2 *Form 4.2-4 Item 14*	6 81.7 *Form 4.2-5 Item 14*
Difference	7 *121,500* *Item 4 – Item 1*	8 *28.5* *Item 2 – Item 5*	9 *36.7* *Item 6 – Item 3*
Difference (as % of pre-developed)	10 *60.2%* *Item 7 / Item 1*	11 *68.3%* *Item 8 / Item 2*	12 *81.5%* *Item 9 / Item 3*

Form 4.2-3 Hydromodification Assessment for Runoff Volume (DA 1)

Weighted Curve Number Determination for: <u>Pre</u>-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1a Land Cover type								
2a Hydrologic Soil Group (HSG)								
3a DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
4a Curve Number (CN) *use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								
Weighted Curve Number Determination for: <u>Post</u>-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1b Land Cover type								
2b Hydrologic Soil Group (HSG)								
3b DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
4b Curve Number (CN) *use Items 5 and 6 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								

5 Pre-Developed area-weighted CN:	**7** Pre-developed soil storage capacity, S (in): *S = (1000 / Item 5) - 10*	**9** Initial abstraction, I_a (in): *I_a = 0.2 * Item 7*
6 Post-Developed area-weighted CN:	**8** Post-developed soil storage capacity, S (in): *S = (1000 / Item 6) - 10*	**10** Initial abstraction, I_a (in): *I_a = 0.2 * Item 8*

11 Precipitation for 10 yr, 24 hr storm (in):
Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

12 Pre-developed Volume (ft^3):
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 9)^2 / ((Item 11 – Item 9 + Item 7)*

13 Post-developed Volume (ft^3):
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 10)^2 / ((Item 11 – Item 10 + Item 8)*

14 Volume Reduction needed to meet hydromodification requirement, (ft^3):
*Vhydro = (Item 13 * 0.95) – Item 12*

Form 4.2-4 Hydromodification Assessment for Time of Concentration (DA 1)

Compute time of concentration for pre and post developed conditions for each DA *(For projects using the Hydrology Manual complete the form below)*

Variables	Pre-developed DA1 *Use additional forms if there are more than 4 DMA*				Post-developed DA1 *Use additional forms if there are more than 4 DMA*			
	DMA A	DMA B	DMA C	DMA D	DMA A	DMA B	DMA C	DMA D
1 Length of flowpath (ft) *Use Form 3-2 Item 5 for pre-developed condition*								
2 Change in elevation (ft)								
3 Slope (ft/ft), *S_o = Item 2 / Item 1*								
4 Land cover								
5 Initial DMA Time of Concentration (min) *Appendix C-1 of the TGD for WQMP*								
6 Length of conveyance from DMA outlet to project site outlet (ft) *May be zero if DMA outlet is at project site outlet*								
7 Cross-sectional area of channel (ft^2)								
8 Wetted perimeter of channel (ft)								
9 Manning's roughness of channel (n)								
10 Channel flow velocity (ft/sec) *V_{fps} = (1.49 / Item 9) * (Item 7/Item 8)$^{\wedge 0.67}$ * (Item 3)$^{\wedge 0.5}$*								
11 Travel time to outlet (min) *T_t = Item 6 / (Item 10 * 60)*								
12 Total time of concentration (min) *T_c = Item 5 + Item 11*								
13 Pre-developed time of concentration (min):	*Minimum of Item 12 pre-developed DMA*							
14 Post-developed time of concentration (min):	*Minimum of Item 12 post-developed DMA*							
15 Additional time of concentration needed to meet hydromodification requirement (min):	*$T_{C\text{-}Hydro}$ = (Item 13 * 0.95) – Item 14*							

Form 4.2-5 Hydromodification Assessment for Peak Runoff (DA 1)

Compute peak runoff for pre- and post-developed conditions

Variables		Pre-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*			Post-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*		
		DMA A	DMA B	DMA C	DMA A	DMA B	DMA C
1 Rainfall Intensity for storm duration equal to time of concentration *I_{peak} = 10^(LOG Form 4.2-1 Item 4 - 0.7 LOG Form 4.2-4 Item 5 /60)*							
2 Drainage Area of each DMA (Acres) *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
3 Ratio of pervious area to total area *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
4 Pervious area infiltration rate (in/hr) *Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP*							
5 Maximum loss rate (in/hr) *F_m = Item 3 * Item 4* *Use area-weighted F_m from DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
6 Peak Flow from DMA (cfs) *Q_p =Item 2 * 0.9 * (Item 1 - Item 5)*							
7 Time of concentration adjustment factor for other DMA to site discharge point *Form 4.2-4 Item 12 DMA / Other DMA upstream of site discharge point (If ratio is greater than 1.0, then use maximum value of 1.0)*	DMA A	*n/a*			*n/a*		
	DMA B		*n/a*			*n/a*	
	DMA C			*n/a*			*n/a*

8 Pre-developed Q_p at T_c for DMA A: *Q_p = Item 6_{DMAA} + [Item 6_{DMAB} * (Item 1_{DMAA} - Item 5_{DMAB})/(Item 1_{DMAB} - Item 5_{DMAB})* Item $7_{DMAA/2}$] + [Item 6_{DMAC} * (Item 1_{DMAA} - Item 5_{DMAC})/(Item 1_{DMAC} - Item 5_{DMAC})* Item $7_{DMAA/3}$]*	9 Pre-developed Q_p at T_c for DMA B: *Q_p = Item 6_{DMAB} + [Item 6_{DMAA} * (Item 1_{DMAB} - Item 5_{DMAA})/(Item 1_{DMAA} - Item 5_{DMAA})* Item $7_{DMAB/1}$] + [Item 6_{DMAC} * (Item 1_{DMAB} - Item 5_{DMAC})/(Item 1_{DMAC} - Item 5_{DMAC})* Item $7_{DMAB/3}$]*	10 Pre-developed Q_p at T_c for DMA C: *Q_p = Item 6_{DMAC} + [Item 6_{DMAA} * (Item 1_{DMAC} - Item 5_{DMAA})/(Item 1_{DMAA} - Item 5_{DMAA})* Item $7_{DMAC/1}$] + [Item 6_{DMAB} * (Item 1_{DMAC} - Item 5_{DMAB})/(Item 1_{DMAB} - Item 5_{DMAB})* Item $7_{DMAC/2}$]*
10 Peak runoff from pre-developed condition confluence analysis (cfs): *Maximum of Item 8, 9, and 10 (including additional forms as needed)*		
11 Post-developed Q_p at T_c for DMA A: *Same as Item 8 for post-developed values*	12 Post-developed Q_p at T_c for DMA B: *Same as Item 9 for post-developed values*	13 Post-developed Q_p at T_c for DMA C: *Same as Item 10 for post-developed values*
14 Peak runoff from post-developed condition confluence analysis (cfs): *Maximum of Item 11, 12, and 13 (including additional forms as needed)*		
15 Peak runoff reduction needed to meet Hydromodification Requirement (cfs): $Q_{p-hydro}$ = *(Item 14 * 0.95) – Item 10*		

4.3 BMP Selection and Sizing

Complete the following forms for each project site DA to document that the proposed treatment (LID/Bioretention) BMPs conform to the project DCV developed to meet performance criteria specified in the Phase II Small MS4 Permit (WQMP Template Section 4.2). For the LID DCV, the forms are ordered according to hierarchy of BMP selection as required by the Phase II Small MS4 Permit (see Section 5.3 in the TGD for WQMP). The forms compute the following for on-site LID BMP:

- Site Design Measures (Form 4.3-2)
- Retention and Infiltration BMPs (Form 4.3-3) or
- Biotreatment BMPs (Form 4.3-4).

> Please note that the selected BMPs may also be used as dual purpose for on-site, hydromodification mitigation and management.

At the end of each form, additional fields facilitate the determination of the extent of mitigation provided by the specific BMP category, allowing for use of the next category of BMP in the hierarchy, if necessary.

The first step in the analysis, using Section 5.3.2 of the TGD for WQMP, is to complete Forms 4.3-1 and 4.3-3) to determine if retention and infiltration BMPs are infeasible for the project. For each feasibility criterion in Form 4.3-1, if the answer is “Yes,” provide all study findings that includes relevant calculations, maps, data sources, etc. used to make the determination of infeasibility.

Next, complete Form 4.3-2 to determine the feasibility of applicable Site Design BMPs, and, if their implementation is feasible, the extent of mitigation of the DCV.

If no site constraints exist that would limit the type of BMP to be implemented in a DA, evaluate the use of combinations of LID BMPs, including all applicable Site Design BMPs to maximize on-site retention of the DCV. If no combination of BMP can mitigate the entire DCV, implement the single BMP type, or combination of BMP types, that maximizes on-site retention of the DCV within the minimum effective area.

If the combination of site design, retention and/or infiltration BMPs is unable to mitigate the entire DCV, then the remainder of the volume-based performance criteria that cannot be achieved with site design, retention and/or infiltration BMPs must be managed through biotreatment BMPs. If biotreatment BMPs are used, then they must be sized to provide equivalent effectiveness based on Template Section 4.3.4.

4.3.1 Exceptions to Requirements for Bioretention Facilities

Contingent on a demonstration that use of bioretention or a facility of equivalent effectiveness is infeasible, other types of biotreatment or media filters (such as tree-box-type biofilters or in-vault media filters) may be used for the following categories of Regulated Projects:

1) Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;

2) Facilities receiving runoff solely from existing (pre-project) impervious areas; and

3) Historic sites, structures or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

Form 4.3-1 Infiltration BMP Feasibility (DA 1)
Feasibility Criterion – Complete evaluation for each DA on the Project Site
1 Would infiltration BMP pose significant risk for groundwater related concerns? Yes ☐ No ☒ *Refer to Section 5.3.2.1 of the TGD for WQMP*
If Yes, Provide basis: (attach)
2 Would installation of infiltration BMP significantly increase the risk of geotechnical hazards? Yes ☐ No ☒ (Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert): • The location is less than 50 feet away from slopes steeper than 15 percent • The location is less than ten feet from building foundations or an alternative setback. • A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.
If Yes, Provide basis: (attach)
3 Would infiltration of runoff on a Project site violate downstream water rights? Yes ☐ No ☒
If Yes, Provide basis: (attach)
4 Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils? Yes ☐ No ☒
If Yes, Provide basis: (attach)
5 Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)? Yes ☐ No ☒
If Yes, Provide basis: (attach)
6 Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses? Yes ☐ No ☒ *See Section 3.5 of the TGD for WQMP and WAP*
If Yes, Provide basis: (attach)
7 Any answer from Item 1 through Item 3 is "Yes": Yes ☐ No ☒ *If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Selection and Evaluation of Biotreatment BMP.* *If no, then proceed to Item 8 below.* 8 Any answer from Item 4 through Item 6 is "Yes": Yes ☐ No ☒ *If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Site Design BMP.* *If no, then proceed to Item 9, below.* 9 All answers to Item 1 through Item 6 are "No": *Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP.* *Proceed to Form 4.3-2, Site Design BMPs.*

4.3.2 Site Design BMP

Section E.12.e. of the Small Phase II MS4 Permit emphasizes the use of LID preventative measures; and the use of Site Design Measures reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable Site Design Measures shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of Site Design BMPs. If a project cannot feasibly meet BMP sizing requirements or cannot fully address hydromodification, feasibility of all applicable Site Design BMPs must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design BMP. Refer to Section 5.4 in the TGD for more detailed guidance.

Form 4.3-2 Site Design BMPs (DA 1)

1 Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☒ No ☐ *If yes, complete Items 2-5; If no, proceed to Item 6*	DA 1 DMA BMP Type	DA 2 DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Total impervious area draining to pervious area (ft^2)	906,402	1,270,727	
3 Ratio of pervious area receiving runoff to impervious area	0.42	0.42	
4 Retention volume achieved from impervious area dispersion (ft^3) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff*	15,862	38,566	
5 Sum of retention volume achieved from impervious area dispersion (ft^3): 54,428 $V_{retention}$ *=Sum of Item 4 for all BMPs*			
6 Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☒ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
7 Ponding surface area (ft^2)			
8 Ponding depth (ft) (min. 0.5 ft.)			
9 Surface area of amended soil/gravel (ft^2)			
10 Average depth of amended soil/gravel (ft) (min. 1 ft.)			
11 Average porosity of amended soil/gravel			
12 Retention volume achieved from on-lot infiltration (ft^3) $V_{retention}$ *= (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)*			
13 Runoff volume retention from on-lot infiltration (ft^3): 0 $V_{retention}$ *=Sum of Item 12 for all BMPs*			

Form 4.3-2 cont. Site Design BMPs (DA 1)

14 Implementation of Street Trees: Yes ☐ No ☒ *If yes, complete Items 14-18. If no, proceed to Item 19*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
15 Number of Street Trees			
16 Average canopy cover over impervious area (ft^2)			
17 Runoff volume retention from street trees (ft^3) *$V_{retention}$ = Item 15 * Item 16 * (0.05/12) assume runoff retention of 0.05 inches*			
18 Runoff volume retention from street tree BMPs (ft^3): 0 *$V_{retention}$ = Sum of Item 17 for all BMPs*			
19 Total Retention Volume from Site Design BMPs: 54,428 *Sum of Items 5, 13 and 18*			

4.3.3 Infiltration BMPs

Use Form 4.3-3 to compute on-site retention of runoff from proposed retention and infiltration BMPs. Volume retention estimates are sensitive to the percolation rate used, which determines the amount of runoff that can be infiltrated within the specified drawdown time. The infiltration safety factor reduces field measured percolation to account for potential inaccuracy associated with field measurements, declining BMP performance over time, and compaction during construction. Appendix C of the TGD for WQMP provides guidance on estimating an appropriate safety factor to use in Form 4.3-3.

If site constraints limit the use of BMPs to a single type and implementation of retention and infiltration BMPs mitigate no more than 40% of the DCV, then they are considered infeasible and the Project Proponent may evaluate the effectiveness of BMPs lower in the LID hierarchy of use (Section 5.5 of the TGD for WQMP)

If implementation of infiltrations BMPs is feasible as determined using Form 4.3-1, then LID infiltration BMPs shall be implemented to the MEP (section 4.1 of the TGD for WQMP).

4.3.3.1 Allowed Variations for Special Site Conditions

The bioretention system design parameters of this Section may be adjusted for the following special site conditions:

1) Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.

2) Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a “flow-through planter”).

3) Facilities located in areas of high groundwater, highly infiltrative soils or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.

4) Facilities serving high-risk areas such as fueling stations, truck stops, auto repairs, and heavy industrial sites may be required to provide adequate pretreatment to address pollutants of concern unless these high-risk areas are isolated from storm water runoff or bioretention areas with no chance of spill migration.

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Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

[1] Remaining LID DCV not met by site design BMP (ft^3): 46,688 *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item19*

BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
[2] Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix C of the TGD for WQMP for minimum requirements for assessment methods*	0.7		
[3] Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2		
[4] Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	0.35		
[5] Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
[6] Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	1.4		
[7] Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	1.4		
[8] Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	69,161		
[9] Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*			
[10] Amended soil porosity	0		
[11] Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	0		
[12] Gravel porosity	0		
[13] Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3		
[14] Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	102,877		
[15] Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	0		

[16] Total Retention Volume from LID Infiltration BMPs: 102,877 *(Sum of Items 14 and 15 for all infiltration BMP included in plan)*

[17] Fraction of DCV achieved with infiltration BMP: 100% *Retention% = Item 16 / Form 4.2-1 Item 7*

[18] Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐

If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.

4.3.4 Biotreatment BMP

Biotreatment BMPs may be considered if the full LID DCV cannot be met by maximizing retention and infiltration. A key consideration when using biotreatment BMP is the effectiveness of the proposed BMP in addressing the pollutants of concern for the project (see Table 5-5 of the TGD for WQMP).

Use Form 4.3-4 to summarize the potential for volume based and/or flow based biotreatment options to biotreat the remaining unmet LID DCV. Biotreatment computations are included as follows:

- Use Form 4.3-5 to compute biotreatment in small volume based biotreatment BMP (e.g. bioretention w/underdrains);
- Use Form 4.3-6 to compute biotreatment in large volume based biotreatment BMP (e.g. constructed wetlands);
- Use Form 4.3-7 to compute sizing criteria for flow-based biotreatment BMP (e.g. bioswales)

Form 4.3-4 Selection and Evaluation of Biotreatment BMP (DA 1)		
1 Remaining LID DCV not met by site design , or infiltration, BMP for potential biotreatment (ft^3): 0 *Form 4.2-1 Item 7 - Form 4.3-2 Item 19 – Form 4.3-3 Item 16*	List pollutants of concern *Copy from Form 2.3-1.*	
2 Biotreatment BMP Selected	Volume-based biotreatment *Use Forms 4.3-5 and 4.3-6 to compute treated volume*	Flow-based biotreatment *Use Form 4.3-7 to compute treated flow*
(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)	☐ Bioretention with underdrain ☐ Planter box with underdrain ☐ Constructed wetlands ☐ Wet extended detention ☐ Dry extended detention	☐ Vegetated swale ☐ Vegetated filter strip ☐ Proprietary biotreatment
3 Volume biotreated in volume based biotreatment BMP (ft^3): *Form 4.3-5 Item 15 + Form 4.3-6 Item 13*	4 Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft^3): *Item 1 – Item 3*	5 Remaining fraction of LID DCV for sizing flow based biotreatment BMP: % *Item 4 / Item 1*
6 Flow-based biotreatment BMP capacity provided (cfs): *Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)*		
7 Metrics for MEP determination: • Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☐ *If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.*		

Form 4.3-5 Volume Based Biotreatment (DA 1) – Bioretention and Planter Boxes with Underdrains

Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*			
2 Amended soil infiltration rate *Typical ~ 5.0*			
3 Amended soil infiltration safety factor *Typical ~ 2.0*			
4 Amended soil design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*			
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*			
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12 * Item 4 * Item 5) or Item 6*			
8 Amended soil surface area (ft^2)			
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
10 Amended soil porosity, *n*			
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
12 Gravel porosity, *n*			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*			
14 Biotreated Volume (ft^3) *$V_{biotreated}$ = Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*			
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 0 *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-6 Volume Based Biotreatment (DA 1) – Constructed Wetlands and Extended Detention

Biotreatment BMP Type *Constructed wetlands, extended wet detention, extended dry detention, or other comparable proprietary BMP. If BMP includes multiple modules (E.g. forebay and main basin), provide separate estimates for storage and pollutants treated in each module.*	DA DMA BMP Type		DA DMA BMP Type *(Use additional forms for more BMPs)*	
	Forebay	Basin	Forebay	Basin
1 Pollutants addressed with BMP forebay and basin *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*				
2 Bottom width (ft)				
3 Bottom length (ft)				
4 Bottom area (ft²) *A_{bottom} = Item 2 * Item 3*				
5 Side slope (ft/ft)				
6 Depth of storage (ft)				
7 Water surface area (ft²) $A_{surface}$ *=(Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))*				
8 Storage volume (ft³) *For BMP with a forebay, ensure fraction of total storage is within ranges specified in BMP specific fact sheets, see Table 5-6 of the TGD for WQMP for reference to BMP design details* V =*Item 6 / 3 * [Item 4 + Item 7 + (Item 4 * Item 7)^0.5]*				
9 Drawdown Time (hrs) *Copy Item 6 from Form 2.1*				
10 Outflow rate (cfs) *Q_{BMP} = (Item $8_{forebay}$ + Item 8_{basin}) / (Item 9 * 3600)*				
11 Duration of design storm event (hrs)				
12 Biotreated Volume (ft³) *$V_{biotreated}$ = (Item $8_{forebay}$ + Item 8_{basin}) +(Item 10 * Item 11 * 3600)*				
13 Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention : *(Sum of Item 12 for all BMP included in plan)*				

Form 4.3-7 Flow Based Biotreatment (DA 1)			
Biotreatment BMP Type *Vegetated swale, vegetated filter strip, or other comparable proprietary BMP*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in TGD Table 5-5*			
2 Flow depth for water quality treatment (ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
3 Bed slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
4 Manning's roughness coefficient			
5 Bottom width (ft) *b_w = (Form 4.3-5 Item 6 * Item 4) / (1.49 * Item $2^{1.67}$ * Item $3^{0.5}$)*			
6 Side Slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
7 Cross sectional area (ft^2) *A = (Item 5 * Item 2) + (Item 6 * Item 2^{2})*			
8 Water quality flow velocity (ft/sec) *V = Form 4.3-5 Item 6 / Item 7*			
9 Hydraulic residence time (min) *Pollutant specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
10 Length of flow based BMP (ft) *L = Item 8 * Item 9 * 60*			
11 Water surface area at water quality flow depth (ft^2) *SA_{top} = (Item 5 + (2 * Item 2 * Item 6)) * Item 10*			

4.3.5 Conformance Summary

Complete Form 4.3-8 to demonstrate how on-site LID DCV is met with proposed site design, infiltration, and/or biotreatment BMP. The bottom line of the form is used to describe the basis for infeasibility determination for on-site LID BMP to achieve full LID DCV, and provides methods for computing remaining volume to be addressed in an alternative compliance plan. If the project has more than one outlet, then complete additional versions of this form for each outlet.

Form 4.3-8 Conformance Summary and Alternative Compliance Volume Estimate (DA 1)

1 Total LID DCV for the Project DA-1 (ft^3): 101,116 *Copy Item 7 in Form 4.2-1*

2 On-site retention with site design BMP (ft^3): 54,428 *Copy Item18 in Form 4.3-2*

3 On-site retention with LID infiltration BMP (ft^3): 102,877 *Copy Item 16 in Form 4.3-3*

4 On-site biotreatment with volume based biotreatment BMP (ft^3): 0 *Copy Item 3 in Form 4.3-4*

5 Flow capacity provided by flow based biotreatment BMP (cfs): 0 *Copy Item 6 in Form 4.3-4*

6 LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design or infiltration BMP: Yes ☒ No ☐
  If yes, sum of Items 2, 3, and 4 is greater than Item 1
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☒ No ☐
  If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized
- On-site retention and infiltration is determined to be infeasible; therefore biotreatment BMP provides biotreatment for all pollutants of concern for full LID DCV: Yes ☐ No ☒
  If yes, Form 4.3-1 Items 7 and 8 were both checked yes

7 If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of Site Design, retention and infiltration, , and biotreatment BMPs provide less than full LID DCV capture: ☐
  *Checked yes if Form 4.3-4 Item 7is checked yes, Form 4.3-4 Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, V_{alt} = (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*

- Facilities, or a combination of facilities, of a different design than in Section E.12.e.(ii)(f) may be permitted if all of the following Phase II Small MS4 General Permit 2013-0001-DWQ 55 February 5, 2013 measures of equivalent effectiveness are demonstrated:
  1) Equal or greater amount of runoff infiltrated or evapotranspired; ☐
  2) Equal or lower pollutant concentrations in runoff that is discharged after biotreatment; ☐
  3) Equal or greater protection against shock loadings and spills; ☐
  4) Equal or greater accessibility and ease of inspection and maintenance. ☐

4.3.6 Hydromodification Control BMP

Use Form 4.3-9 to compute the remaining runoff volume retention, after Site Design BMPs are implemented, needed to address hydromodification, and the increase in time of concentration and decrease in peak runoff necessary to meet targets for protection of waterbodies with a potential hydromodification. Describe the proposed hydromodification treatment control BMP. Section 5.6 of the TGD for WQMP provides additional details on selection and evaluation of hydromodification control BMP.

Form 4.3-9 Hydromodification Control BMPs (DA 1)	
1 Volume reduction needed for hydromodification performance criteria (ft^3): 105,335 *(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1*	2 On-site retention with site design and infiltration, BMP (ft^3): 163,683 *Sum of Form 4.3-8 Items 2, 3, and 4. Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving hydromodification volume reduction*
3 Remaining volume for hydromodification volume capture (ft^3): 0 *Item 1 – Item 2*	4 Volume capture provided by incorporating additional on-site BMPs (ft^3):
5 Is Form 4.2-2 Item 11 less than or equal to 5%: Yes ☐ No ☒ *If yes, hydromodification performance criteria is achieved. If no, select one or more mitigation options below:* • Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site BMP ☒ • Increase time of concentration by preserving pre-developed flow path and/or increase travel time by reducing slope and increasing cross-sectional area and roughness for proposed on-site conveyance facilities ☐	
6 Form 4.2-2 Item 12 less than or equal to 5%: Yes ☐ No ☒ *If yes, hydromodification performance criteria is achieved. If no, select one or more mitigation options below:* • Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site retention BMPs ☒	

4.4 Alternative Compliance Plan (if applicable)

Describe an alternative compliance plan (if applicable) for projects not fully able to infiltrate, or biotreat the DCV via on-site LID practices. A project proponent must develop an alternative compliance plan to address the remainder of the LID DCV. Depending on project type some projects may qualify for water quality credits that can be applied to reduce the DCV that must be treated prior to development of an alternative compliance plan (see Form 2.4-1, Water Quality Credits). Form 4.3-9 Item 8 includes instructions on how to apply water quality credits when computing the DCV that must be met through alternative compliance.

Alternative Designs — Facilities, or a combination of facilities, of a different design than in Permit Section E.12.e.(ii)(f) may be permitted if all of the following measures of equivalent effectiveness are demonstrated:

1) Equal or greater amount of runoff infiltrated or evapotranspired;

2) Equal or lower pollutant concentrations in runoff that is discharged after biotreatment;

3) Equal or greater protection against shock loadings and spills;

4) Equal or greater accessibility and ease of inspection and maintenance.

The Project Proponent will need to obtain written approval for an alternative design from the Lahontan Regional Water Board Executive Officer (see Section 6 of the TGD for WQMP).

Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

All BMPs included as part of the project WQMP are required to be maintained through regular scheduled inspection and maintenance (refer to Section 8, Post Construction BMP Requirements, in the TGD for WQMP). Fully complete Form 5-1 summarizing all BMP included in the WQMP. Attach additional forms as needed. The WQMP shall also include a detailed Operation and Maintenance Plan for all BMP and a Maintenance Agreement. The Maintenance Agreement must also be attached to the WQMP.

Note that at time of Project construction completion, the Maintenance Agreement must be completed, signed, notarized and submitted to the County Stormwater Department

Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
Infiltration Basins	Site Operator	Inspect visually and remove accumulation of trash and and sediment	Monthly

Section 6 WQMP Attachments

6.1. Site Plan and Drainage Plan

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural Source Control BMP locations
- Site Design Hydrologic Source Control BMP locations
- LID BMP details
- Drainage delineations and flow information
- Drainage connections

6.2 Electronic Data Submittal

Minimum requirements include submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open. If the local jurisdiction requires specialized electronic document formats (as described in their Local Implementation Plan), this section will describe the contents (e.g., layering, nomenclature, geo-referencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

6.3 Post Construction

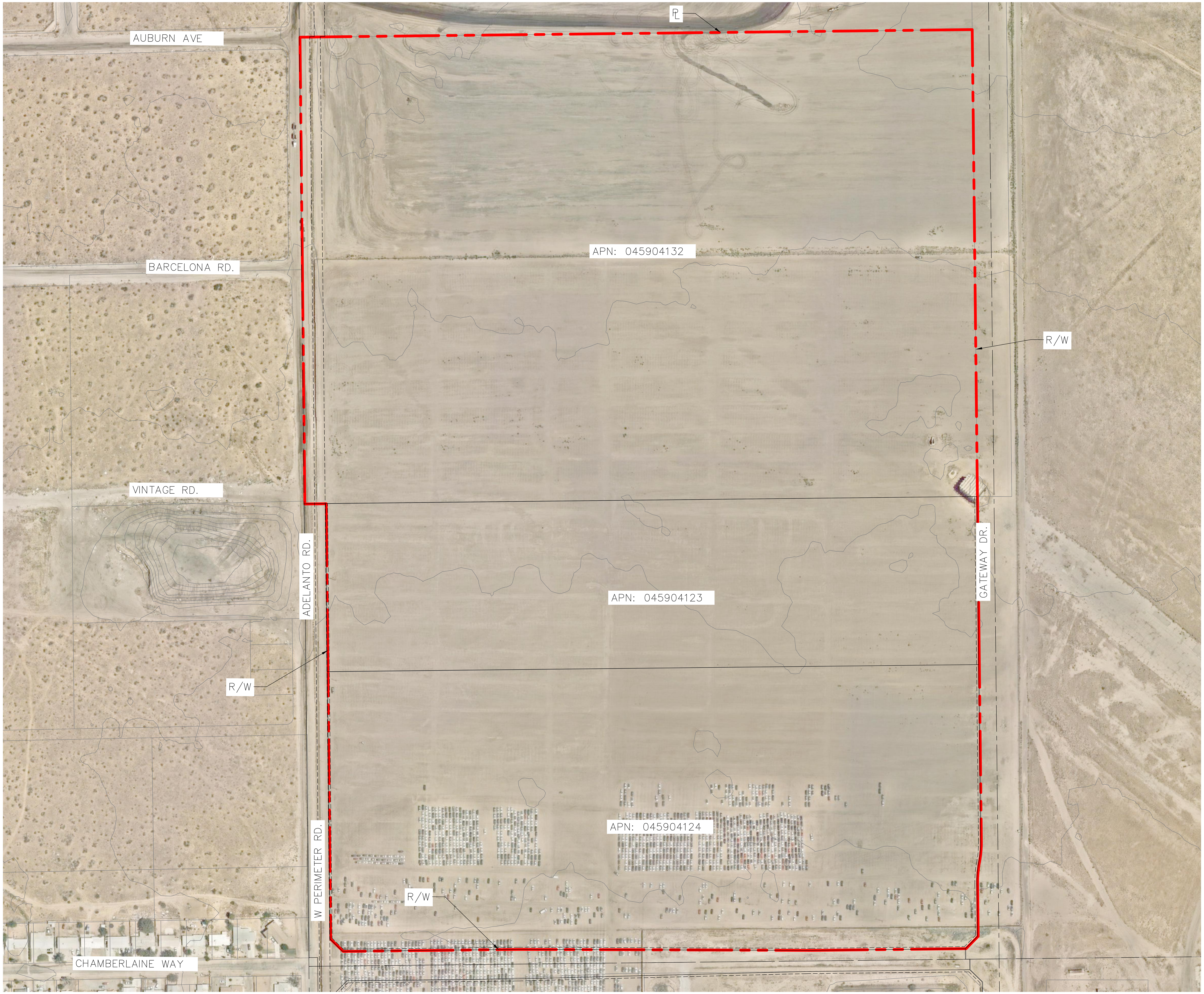
Attach all O&M Plans and Maintenance Agreements for BMP to the WQMP.

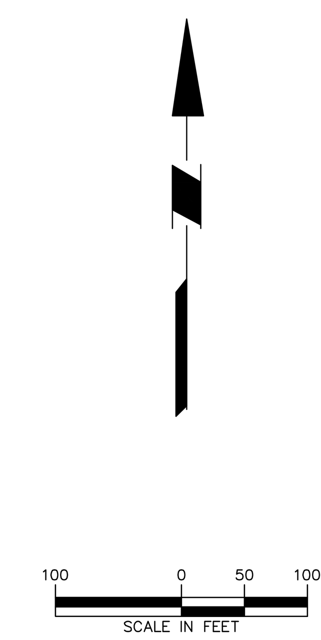
6.4 Other Supporting Documentation

- BMP Educational Materials
- Activity Restriction – C,C&R's & Lease Agreements

APPENDIX A

Vicinity Map, Topographic Map, Site Plan, Grading Plan, Drainage Area Map





Date

Signature Date

LANGAN

Langan Engineering and Environmental Services, Inc.

18575 Jamboree Road, Suite 150
Irvine, CA 92612

949.561.9200 929.561.9201 www.langan.com

Project

PROLOGIS TNS VICTORVILLE

CITY OF VICTORVILLE
SAN BERNARDINO COUNTY CALIFORNIA

Drawing Title

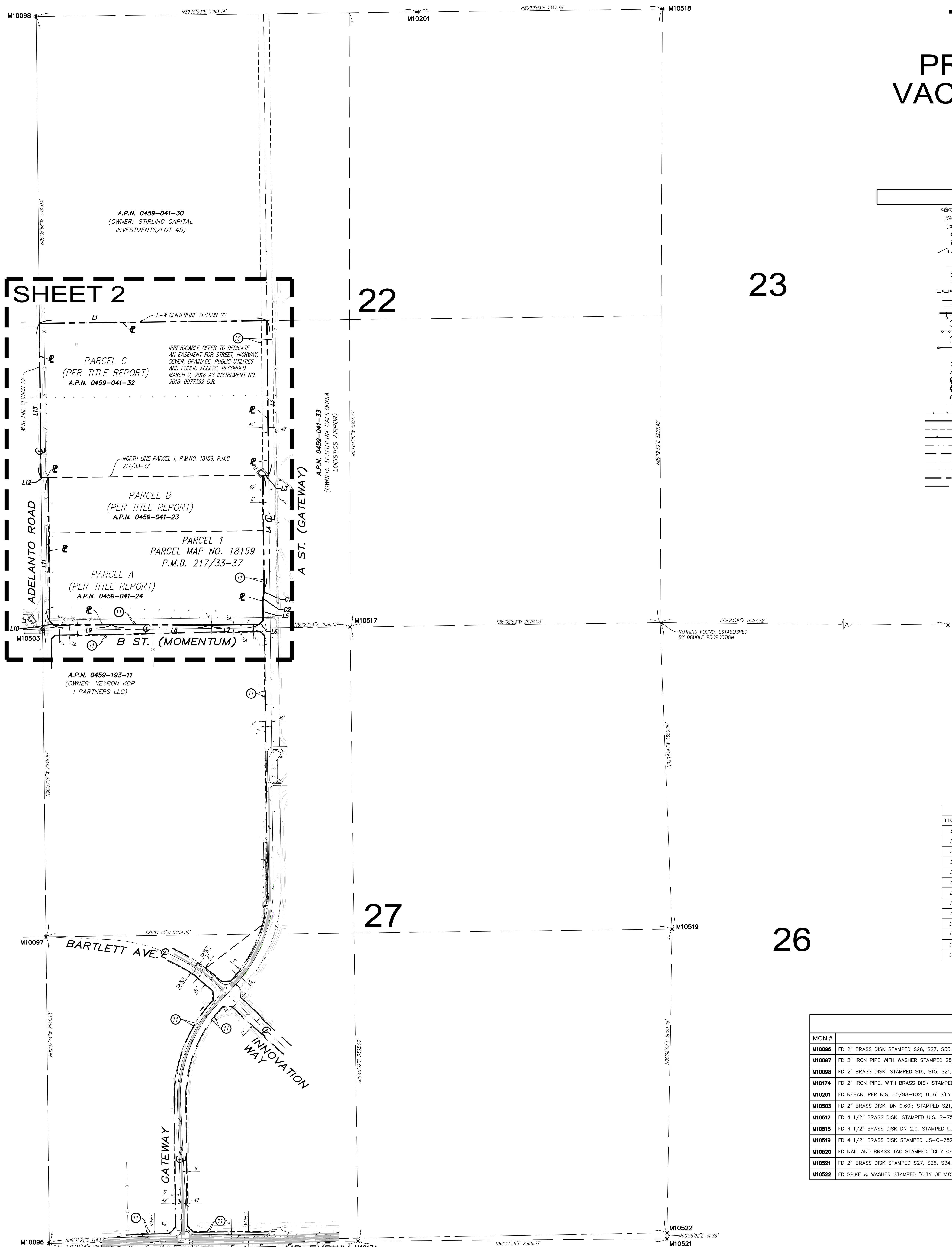
SITE PLAN

Project No. 700089101	Drawing No. CS101
Date 2/17/2021	
Drawn By AL	
Checked By	Sheet 1 of 1

Project No. 001234501

Date: 2/17/2021 Time: 13:29 User: amlu Style Table: Langan.stb Layout: CS101 Document Code: 700089101-0301-CS101-0101

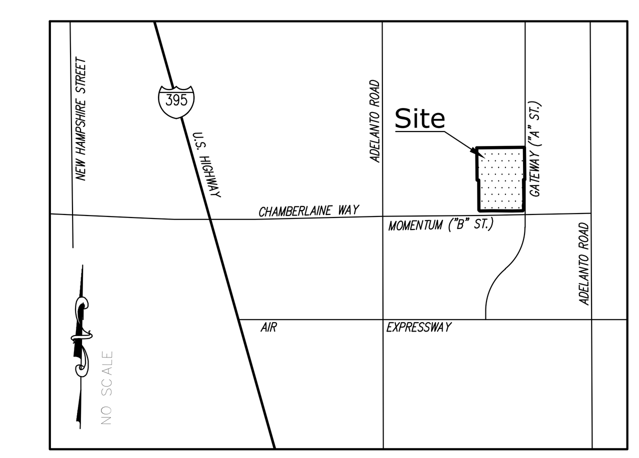
A.L.T.A./N.S.P.S. LAND TITLE SURVEY
PROLOGIS TNS VICTORVILLE
VACANT LAND, VICTORVILLE, CA



AN EASEMENT IN FAVOR OF ADELANTO MUTUAL WATER COMPANY FOR WATER PIPELINE PURPOSES PER DOCUMENT RECORDED IN BOOK 539, PAGE 288 OF OFFICIAL RECORDS AND AS SHOWN ON PARCEL MAP NO. 18985, P.M.B. 236/55-62 (APPROXIMATE CENTERLINE)

GRAPHIC SCALE
350 0 175 350
FEET

VICINITY MAP



LEGEND

- BACK-FLOW VALVE
- CONCRETE PAVEMENT
- FIRE HYDRANT
- FOUND MONUMENT AS NOTED
- GAS VALVE
- GATE
- GUARD POST
- GUY WIRE
- IRRIGATION CONTROL VALVE
- LIGHT STANDARD
- LIGHT STANDARD
- POWER POLE
- POWER POLE W/TRANSFORMER
- POWER POLE W/LIGHT
- SEWER MANHOLE
- SIGN
- STORM DRAIN MANHOLE
- STREET LIGHT
- UTILITY POLE
- WATER VALVE
- APN — ASSESSOR'S PARCEL NUMBER
- CENTERLINE
- PROPERTY LINE
- R/W — RIGHT OF WAY
- CENTERLINE
- CHAIN LINK FENCE
- CONCRETE/RETAINING WALL
- EASEMENT LINE
- EDGE OF PAVEMENT
- FLOW LINE
- INTERIOR LOT LINE
- MONUMENT LINE
- OVERHEAD LINE
- PROPERTY LINE
- RIGHT-OF-WAY

SCHEDULE B ITEMS

BASED UPON TITLE REPORT NO. 997-30060508-TC1, DATED JANUARY 20, 2021 AS PREPARED BY FIDELITY NATIONAL TITLE COMPANY.

A.- PROPERTY TAXES FISCAL YEAR 2021-2022. **(NOT A SURVEY MATTER).**

B.- PROPERTY TAXES FISCAL YEAR 2020-2021. **(NOT A SURVEY MATTER).**

C.- THE LIEN OF SUPPLEMENTAL OR ESCAPED ASSESSMENTS OF PROPERTY TAXES, IF ANY. **(NOT A SURVEY MATTER).**

1.- WATER RIGHTS, CLAIMS OR TITLE TO WATER, WHETHER OR NOT DISCLOSED BY THE PUBLIC RECORDS. **(NONE NOTED).**

2.- EASEMENT(S) IN FAVOR OF THE PUBLIC OVER ANY EXISTING ROADS LYING WITHIN SAID LAND. **(BLANKET IN NATURE OVER EXISTING ROADS).**

3.- ANY EXISTENCE OF TOXIC OR HAZARDOUS WASTE OF ANY ALLEGED VIOLATION OF ANY LAW, ORDINANCE, OR GOVERNMENTAL REGULATION CONCERNING ENVIRONMENTAL PROTECTION AS DISCLOSED BY THE USES OF THE LAND AS SAME NOW EXISTS ON PORTIONS OF SAID PROPERTY. **(THE EXACT EXTENT, LOCATION, AND USE CANNOT BE DETERMINED FROM THE RECORD.)**

4.- AN EASEMENT FOR TELEPHONE LINES, RECORDED MARCH 14, 1928, IN BOOK 339, PAGE 288 OF O.R. **(THE EXACT LOCATION AND EXTEND OF SAID EASEMENT IS NOT DISCLOSED OF RECORD).**

5.- AN EASEMENT FOR WATER PIPELINE, RECORDED SEPTEMBER 17, 1927 IN BOOK 539, PAGE 280 OF O.R. **(THE EXACT LOCATION AND EXTEND OF SAID EASEMENT IS NOT DISCLOSED OF RECORD).**

6.- DISCREPANCIES, CONFLICTS IN BOUNDARY LINES, SHORTAGE IN AREA, ENCROACHMENTS, OR ANY OTHER MATTERS SHOWN ON MAP IN BOOK 65, PAGE 98 OF RECORDS OF SURVEY.

7.- THE LAND DESCRIBED HEREIN IS INCLUDED WITHIN A PROJECT AREA OF THE VICTOR VALLEY ECONOMIC DEVELOPMENT AUTHORITY, PER DOCUMENT RECORDED JULY 15, 1992, DOC. NO. 92-292935; RECORDED DECEMBER 29, 1993, DOC. NO. 93-565775 AND DECEMBER 19, 2007, DOC. NO. 2007-0403538 ALL OF O.R. **(NOT A SURVEY MATTER).**

8.- AN EASEMENT FOR OVERHEAD AND UNDERGROUND ELECTRICAL SUPPLY SYSTEMS AND COMMUNICATION SYSTEMS, GUYING AND ANCHORAGE SYSTEMS, LIGHTING SYSTEMS, ELECTRICAL PAD SYSTEMS, AND ELECTRIC VAULT SYSTEMS, RECORDED SEPTEMBER 05, 1997, DOC. NO. 97-325581 OF O.R. **(BLANKET IN NATURE).**

9.- COVENANTS, CONDITIONS AND RESTRICTIONS RECORDED SEPTEMBER 05, 1997, DOC. NO. 97-325581 OF O.R. **(AN EASEMENT TO SOUTHERN CALIFORNIA EDISON BLANKET IN NATURE).**

10.- COVENANTS, CONDITIONS, RESTRICTIONS AND EASEMENTS RECORDED MAY 21, 2004, DOC. NO. 2004-0360272 OF O.R. **(NOT PLOTTED - NO EASEMENT SPECIFIED).**

11.- AN EASEMENT FOR PIPELINES, AS DELINEATED ON OR AS OFFERED FOR DEDICATION ON PARCEL MAP NO. 18159, IN BOOK 217, PAGES 33-37 INCLUSIVE OF PARCEL MAPS. **(PLOTTED HEREON).**

12.- MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED THIRD AMENDED AND RESTATED MASTER AGREEMENT RECORDED DECEMBER 01, 2006, DOC. NO. 2006-0813812 OF O.R. **(NOT A SURVEY MATTER).**

13.- MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED FIRST AMENDED AND RESTATED MASTER RAIL DEVELOPMENT AGREEMENT RECORDED DECEMBER 01, 2006, DOC. NO. 2006-0813813 AND DEVELOPMENT AGREEMENT ASSIGNMENT AND ASSUMPTION OF FIRST AMENDED AND RESTATED MASTER RAIL RECORDED DECEMBER 01, 2006, DOC. NO. 2006-0813815 BOTH OF O.R. **(NOT A SURVEY MATTER).**

14.- MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED MEMORANDUM OF DISPOSITION AND DEVELOPMENT AGREEMENT, RECORDED DECEMBER 01, 2006, DOC. NO. 2006-0813816 OF O.R. **(NOT A SURVEY MATTER).**

15.- MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED FOURTH AMENDED AND RESTATED MASTER AGREEMENT, RECORDED DECEMBER 27, 2010, DOC. NO. 2010-0545684 OF O.R. **(NOT A SURVEY MATTER).**

16.- AN IRREVOCABLE OFFER TO DEDICATE AN EASEMENT OVER SAID LAND FOR STREET, HIGHWAY, SEWER, DRAINAGE, PUBLIC UTILITIES AND PUBLIC ACCESS, RECORDED MARCH 2, 2018 DOC. NO. 2018-0077392 OF O.R. **(PLOTTED HEREON).**

17.- PLEASE BE ADVISED THAT OUR SEARCH DID NOT DISCLOSE ANY OPEN DEEDS OF TRUST OF RECORD. IF YOU SHOULD HAVE KNOWLEDGE OF ANY OUTSTANDING OBLIGATION, PLEASE CONTACT THE TITLE DEPARTMENT IMMEDIATELY FOR FURTHER REVIEW PRIOR TO CLOSING. **(NOT A SURVEY MATTER).**

18.- ANY RIGHTS OF THE PARTIES IN POSSESSION OF A PORTION OF, OR ALL OF, SAID LAND, WHICH RIGHTS ARE NOT DISCLOSED BY THE PUBLIC RECORDS.
THE COMPANY WILL REQUIRE, FOR REVIEW, A FULL AND COMPLETE COPY OF ANY UNRECORDED AGREEMENT, CONTRACT, LICENSE AND/OR LEASE, TOGETHER WITH ALL SUPPLEMENTS, ASSIGNMENTS AND AMENDMENTS THERETO, BEFORE ISSUING ANY POLICY OF TITLE INSURANCE WITHOUT EXCEPTING THIS ITEM FROM COVERAGE.
THE COMPANY RESERVES THE RIGHT TO EXCEPT ADDITIONAL ITEMS AND/OR MAKE ADDITIONAL REQUIREMENTS AFTER REVIEWING SAID DOCUMENTS. **(NOT A SURVEY MATTER).**

19.- DISCREPANCIES, CONFLICTS IN BOUNDARY LINES, SHORTAGE IN AREA, ENCROACHMENTS, OR ANY OTHER MATTERS WHICH A CORRECT SURVEY WOULD DISCLOSE AND WHICH ARE NOT SHOWN BY THE PUBLIC RECORDS.

20.- ANY EASEMENTS NOT DISCLOSED BY THE PUBLIC RECORDS AS TO MATTERS AFFECTING TITLE TO REAL PROPERTY, WHETHER OR NOT SAID EASEMENTS ARE VISIBLE AND APPARENT. **(NONE NOTED).**

21.- MATTERS WHICH MAY BE DISCLOSED BY AN INSPECTION AND/OR BY A CORRECT ALTA/NSPS LAND TITLE SURVEY OF SAID LAND THAT IS SATISFACTORY TO THE COMPANY, AND/OR BY INQUIRY OF THE PARTIES IN POSSESSION THEREOF.

ZONING RESTRICTIONS

NOTE: INDICATED ZONING INFORMATION IS FROM THE CITY OF VICTORVILLE ZONING ORDINANCES IN EFFECT AS OF THE DATE OF THIS SURVEY. ZONING AND RESTRICTIONS SHOWN HEREON WERE OBTAINED BY A GENERAL REQUEST AT THE PUBLIC COUNTER OF THE ABOVE NAMED DEPARTMENT. NO REPRESENTATION IS MADE FOR THE ACCURACY OR COMPLETENESS OF SAID THIRD PARTY INFORMATION. THIS FIRM IS NOT AN EXPERT IN THE REPRESENTATION OF COMPLEX ZONING ORDINANCES. COMPLIANCE IS BEYOND THE SCOPE OF THIS SURVEY. ANY USER OF SAID INFORMATION IS URGED TO CONTACT THE LOCAL AGENCY DIRECTLY.

ZONE: SP1-92 (SPECIFIC PLAN - LAND USE DESIGNATION - INDUSTRIAL)

MINIMUM SETBACKS:
FRONT:
FROM LOCAL OR COLLECTOR STREET: 20 FEET
FROM ARTERIAL STREET: 30 FEET
SIDE: 10 FEET
REAR: 10 FEET

HEIGHT RESTRICTIONS: 55 FEET

POSSIBLE ENCROACHMENT NOTES

THIS IS A LISTING OF OBSERVED IMPROVEMENTS THAT CROSS PROPERTY LINES. STATEMENT OF OWNERSHIP OR POSSESSION IS NOT THE INTENT OF THIS LISTING.

1 FENCE OVERLAPS THE PROPERTY LINE AS SHOWN

2 BUILDING OVERLAPS THE PROPERTY LINE AS SHOWN

ITEMS CORRESPONDING TO TABLE A ITEMS

- ITEM 14
THE NEAREST INTERSECTING STREET TO THE PROPERTY IS ADELANTO ROAD AND B STREET TO THE SOUTH WEST AS SHOWN HEREON AND IT IS ± 90 FEET.

- ITEM 16
NO EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELD WORK.

- ITEM 17
NO EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELD WORK.

FLOOD NOTE: BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE "D" OF THE FLOOD INSURANCE RATE MAP, PANEL NO. 06071C5785H, PANEL DATED 08/28/2008. THIS PROPERTY IS AN UNDETERMINED FLOOD HAZARDS BY FEMA. BY TELEPHONE CALL TO THE NATIONAL FLOOD INSURANCE PROGRAM (800-638-6620) WE HAVE LEARNED THIS COMMUNITY DOES CURRENTLY PARTICIPATE IN THE PROGRAM. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

ZONE D: AREA OF UNDETERMINED FLOOD HAZARD.

LINE TABLE

LINE #	DIRECTION	LENGTH
L1	S89°17'42"W	1965.71'
L2	N00°37'57"W	1334.40'
L3	N89°22'45"E	49.00'
L4	S00°37'57"E	983.99'
L5	S00°37'57"E	150.00'
L6	N44°22'30"E	49.50'
L7	N89°22'51"E	436.24'
L8	S89°47'55"E	837.94'
L9	N89°22'51"E	501.11'
L10	S45°36'36"E	49.50'
L11	S00°35'58"E	1241.99'
L12	N89°22'45"E	61.00'
L13	S00°35'58"E	1331.52'

CURVE TABLE

CURVE #	RADIUS	DELTA	LENGTH
C1	293.00'	11°25'16"	58.41'
C2	313.00'	11°25'16"	62.39'

MONUMENT NOTES

MON.#	DESCRIPTION
M10096	FD 2" BRASS DISK STAMPED S28, S27, S33, S34 PER C.R. 242-070
M10097	FD 2" IRON PIPE WITH WASHER STAMPED 28/27, FLUSH, PER R.S. 65/98-102, ACCEPTED AS W1/4 COR.
M10098	FD 2" BRASS DISK, STAMPED S16, S15, S21, S22; ACCEPTED AS NORTHWEST CORNER SECTION 22 PER R.S. 65/98-102 & R.S. 49/91
M10174	FD 2" IRON PIPE, WITH BRASS DISK STAMPED 1/4 S27, PER P.M. 18158, P.M.B. 217/22-32 & C.R. 242-073
M10201	FD REBAR, PER R.S. 65/98-102; 0.16' S'LY FROM SECTION LINE
M10503	FD 2" BRASS DISK, DN 0.60'; STAMPED S21, S22, S28, S27 PER R.S. 01-206, R.S. 116/13
M10517	FD 4 1/2" BRASS DISK, STAMPED U.S. R-752, ACCEPTED AS NORTH 1/4 CORNER SECTION 27
M10518	FD 4 1/2" BRASS DISK DN 2.0, STAMPED U.S. R-752, ACCEPTED AS NORTHEAST CORNER SECTION 22 PER R.S. 65/98-102
M10519	FD 4 1/2" BRASS DISK STAMPED US-Q-752, ACCEPTED AS W 1/4 CORNER SECTION 26 PER R.S. 01-206, R.S. 116/13
M10520	FD NAIL AND BRASS TAG STAMPED "CITY OF VICTORVILLE"; ACCEPTED AS NORTH EAST CORNER SECTION 26 PER R.S. 01-206, R.S. 116/13 & C.R. 209-099
M10521	FD 2" BRASS DISK STAMPED S27, S26, S34, S35 PER P.M. 18158, P.M.B. 217/22-32 & C.R. 242-067
M10522	FD SPIKE & WASHER STAMPED "CITY OF VICTORVILLE"; ACCEPTED AS POINT ON CL AIR EXPRESSWAY PER C.R. 242-067

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF VICTORVILLE IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCEL A:

PARCEL 1 OF PARCEL MAP NO. 18159, FILED IN BOOK 217, PAGES 33 THROUGH 37 INCLUSIVE OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID SAN BERNARDINO COUNTY, EXCEPT THAT PORTION DESCRIBED AS FOLLOWS:

THAT CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, BEING THAT PORTION OF PARCEL 1 OF PARCEL MAP NO. 18159, FILED IN BOOK 217, PAGES 33 THROUGH 37 INCLUSIVE OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID SAN BERNARDINO COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEASTERLY CORNER OF SAID PARCEL 1; THENCE ALONG THE EASTERLY LINE OF SAID PARCEL SOUTH 00°37'56" EAST 479.25 FEET TO A LINE PARALLEL WITH AND 479.25 FEET SOUTHERLY OF THE NORTHERLY LINE OF SAID PARCEL; THENCE ALONG SAID PARALLEL LINE SOUTH 89°22'46" WEST 1856.75 FEET TO THE WESTERLY LINE OF SAID PARCEL; THENCE ALONG SAID WESTERLY LINE NORTH 00°35'57" WEST 479.25 FEET TO THE NORTHWESTERLY CORNER OF SAID PARCEL; THENCE ALONG SAID NORTHERLY LINE NORTH 89°22'46" EAST 1856.48 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM 10% OF THE GROSS FAIR MARKET VALUE OF OIL, GAS, OR MINERALS, AS RESERVED BY THE UNITED STATES OF AMERICA IN DOCUMENT RECORDED MAY 21, 2004 AS INSTRUMENT NO. 2004-0360272 OF OFFICIAL RECORDS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

APN: 0459-041-24-0-000

PARCEL B:

THAT CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, BEING THAT PORTION OF PARCEL 1 OF PARCEL MAP NO. 18159, FILED IN BOOK 217, PAGES 33 THROUGH 37 INCLUSIVE OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID SAN BERNARDINO COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEASTERLY CORNER OF SAID PARCEL 1; THENCE ALONG THE EASTERLY LINE OF SAID PARCEL SOUTH 00°37'56" EAST 479.25 FEET TO A LINE PARALLEL WITH AND 479.25 FEET SOUTHERLY OF THE NORTHERLY LINE OF SAID PARCEL; THENCE ALONG SAID PARALLEL LINE SOUTH 89°22'46" WEST 1856.75 FEET TO THE WESTERLY LINE OF SAID PARCEL; THENCE ALONG SAID WESTERLY LINE NORTH 00°35'57" WEST 479.25 FEET TO THE NORTHWESTERLY CORNER OF SAID PARCEL; THENCE ALONG SAID NORTHERLY LINE NORTH 89°22'46" EAST 1856.48 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM 10% OF THE GROSS FAIR MARKET VALUE OF OIL, GAS, OR MINERALS, AS RESERVED BY THE UNITED STATES OF AMERICA IN DOCUMENTS RECORDED MAY 21, 2004 AS INSTRUMENT NO. 2004-0360272, AND MAY 21, 2004 AS INSTRUMENT NO. 2004-0360273, BOTH OF OFFICIAL RECORDS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

APN: 0459-041-23-0-000

PARCEL C

THAT PORTION OF SECTION 22 OF TOWNSHIP 6 NORTH, RANGE 5 WEST, SAN BERNARDINO MERIDIAN, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, BEING A PORTION OF THAT LAND CONVEYED TO SOUTHERN CALIFORNIA LOGISTICS AIRPORT AUTHORITY BY DOCUMENT RECORDED MAY 21, 2004 AS INSTRUMENT NO. 2004-0360272 OF OFFICIAL RECORDS OF THE COUNTY RECORDER OF SAID COUNTY, DESCRIBED AS FOLLOWS:

COMMENCING AT THE INTERSECTION OF THE CENTERLINE OF "A" STREET AND "B" STREET AS SHOWN ON PARCEL MAP NO. 18159, FILED IN BOOK 217, PAGES 33 THROUGH 37 INCLUSIVE OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND SAID CENTERLINE OF "B" STREET ALSO BEING THE SOUTH LINE OF WEST HALF OF SAID SECTION 22 AS SHOWN ON SAID PARCEL MAP; THENCE NORTH 00°37'56" WEST ALONG SAID THE CENTERLINE OF "A" STREET 1319.00 FEET TO A POINT OF INTERSECTION WITH THE EASTERLY PROLONGATION OF THE NORTHERLY LINE OF PARCEL 1 OF SAID PARCEL MAP NO. 18159, AND SAID POINT BEING THE TRUE POINT OF BEGINNING; THENCE CONTINUING ALONG THE PROLONGATION OF SAID CENTERLINE OF "A"STREET NORTH 00°37'56" WEST 1334.49 FEET TO THE EAST-WEST CENTER SECTION LINE OF SAID SECTION 22; THENCE SOUTH 89°17'39" WEST 1965.71 FEET ALONG SAID EAST-WEST CENTERLINE TO THE WEST LINE OF SAID SECTION 22; THENCE SOUTH 00°35'57" EAST 1331.56 FEET ALONG SAID WEST LINE TO A POINT OF INTERSECTION WITH THE WESTERLY PROLONGATION OF SAID NORTHERLY LINE OF PARCEL 1; THENCE NORTH 89°22'46" EAST 1966.48 FEET ALONG SAID PROLONGATION TO THE TRUE POINT OF BEGINNING.

EXCEPT THEREFROM, AN OVERRIDING ROYALTY OF 10% OF THE GROSS FAIR MARKET VALUE OF OIL, GAS, OR MINERAL EXTRACTED FROM THE PROPERTY AS SET FORTH IN THE DOCUMENT RECORDED MAY 21, 2004 AS INSTRUMENT NO. 2004-0360272 OF OFFICIAL RECORDS.

APN: 0459-041-32-0-000

ITEMS CORRESPONDING TO TABLE A ITEMS

- ITEM 14
THE NEAREST INTERSECTING STREET TO THE PROPERTY IS ADELANTO ROAD AND B STREET TO THE SOUTH WEST AS SHOWN HEREON AND IT IS ± 90 FEET.

- ITEM 16
NO EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELD WORK.

- ITEM 17
NO EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELD WORK.

SURVEYOR'S NOTES

- THE UTILITIES SHOWN HEREON ARE BASED ON OBSERVED EVIDENCE ONLY. THIS SURVEY WOULD NOT SHOW UTILITIES COVERED BY CARS/TRUCKS OR RECENTLY PAVED ASPHALT/CONCRETE OR OVERGROWN BRUSH, TREES AND SHRUBS.
- THIS SURVEY HAS BEEN PREPARED FOR TITLE INSURANCE PURPOSES ONLY. THIS SURVEY DOES NOT CONTAIN SUFFICIENT DETAIL FOR DESIGN PURPOSES. THE BOUNDARY DATA AND TITLE MATTERS AS SHOWN HEREON HAVE BEEN DEVELOPED FROM THE REFERENCED TITLE REPORT.
- UNLESS THIS PLAN HAS THE SEAL AND SIGNATURE OF THE SURVEYOR AND/OR ENGINEER RESPONSIBLE FOR ITS PREPARATION, THIS IS NOT AN AUTHENTIC COPY OF THE ORIGINAL SURVEY AND SHALL NOT BE DEEMED RELIABLE.

SURVEYOR'S CERTIFICATE

TO STIRLING CAPITAL INVESTMENTS/LOT 44, LLC, A DELAWARE LIMITED LIABILITY COMPANY AND FIDELITY NATIONAL TITLE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1 (FOUND MONUMENTS ONLY), 2, 3, 4, 5, 6(a), 7(a), 7(b)(1), 7(c), 8, 9, 10, 11(a) (VISIBLE EVIDENCE ONLY), 13, 14, 16, 17, 18 AND 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON MARCH 13, 2021.

DATE OF PLAT OR MAP: MARCH 16, 2021.

REVISIONS

NO.	DATE	REVISIONS	BY
0	03/16/21	SUBMITTAL	CE

UTILITY STATEMENT

BURIED UTILITIES AND/OR PIPELINES SHOWN HEREON ARE PER VISIBLE AND APPARENT SURFACE EVIDENCE, RECORD DRAWINGS OF THE CONSTRUCTED UTILITY LINES OBTAINED FROM RELIABLE AND RESPONSIBLE SOURCES NOT CONNECTED WITH CALVADA SURVEYING, INC. OR MARKINGS PROVIDED BY AN INDEPENDENT LOCATING CONTRACTOR. NO GUARANTEE OR WARRANTY, EITHER EXPRESSED OR IMPLIED, IS MADE AS TO THE ACCURACY OR THOROUGHNESS OF SUCH INFORMATION. IF MORE ACCURATE LOCATIONS OF UNDERGROUND UTILITIES OR PIPE LINES ARE REQUIRED, THE UTILITY OR PIPELINE WILL HAVE TO BE VERIFIED BY FIELD POTHOLING. CALVADA SURVEYING, INC. AND THE SURVEYOR OF RECORD SHALL NOT BE HELD LIABLE FOR THE LOCATION OF OR THE FAILURE TO NOTE THE LOCATION OF NON-VISIBLE UTILITIES OR PIPELINES.

Underground Service Alert
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Call: TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

PREPARED FOR

LANGAN
LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC.
18575 JAMBOREE ROAD, SUITE 150
IRVINE, CA 92612

PHONE: (949) 561-9200
FAX: (949) 561-9201

BASIS OF BEARINGS

THE BEARINGS SHOWN HEREON ARE BASED UPON THE CALIFORNIA COORDINATE SYSTEM OF 1983, CCS83, ZONE 5, (2017.50) IN ACCORDANCE TO THE CALIFORNIA PUBLIC RESOURCES CODE SECTIONS 8801-8819; SAID BEARINGS ARE DETERMINED LOCALLY UPON FIELD-OBSERVED TIES TO THE FOLLOWING CALIFORNIA SPATIAL REFERENCE NETWORK CONTINUOUS OPERATING REFERENCE STATIONS (C.O.R.S.):

C.S.R.C. SCIA:
NORTHING = 2044003.43' EASTING = 6745730.79'

C.S.R.C. P586:
NORTHING = 2017796.62' EASTING = 6778350.58'

THE COMBINATION FACTOR FOR THIS PROJECT WAS APPLIED AT THE FOLLOWING POINT:
NORTHING = 6743342.69' EASTING = 2039097.89'

MAPPING ANGLE = -11°19'48.87" SCALE FACTOR = 1.000020575.

BENCHMARK

ELEVATIONS SHOWN HEREON ARE BASED UPON CITY OF VICTORVILLE BENCHMARK Y-747, ELEVATION 2905.31 FEET (NGVD 29).

DESCRIPTION: 8"X8" CONCRETE MONUMENT W/4" IRON CAP STAMPED "USC&GS BM Y-747, 1945" @ 41' S/O AIREXPRESSWAY AND 93' W/O NEVADA AVE EXTENSION

SITE INFORMATION

SITE NAME: PROLOGIS TNS VICTORVILLE
SITE ADDRESS: VACANT LAND VICTORVILLE, CA

PROPERTY AREA:
GROSS: 114.753 AC. OR 4,998,623 SQ. FT.
NET: (EXCLUDING EASEMENT 16 (GATEWAY)) 113.252 AC. OR 4,933,239 SQ. FT.

TOTAL GROUND FLOOR AREA OF BUILDINGS: NO BUILDINGS / VACANT LAND

PARKING COUNT: NO STRIPED PARKING STALLS ON SUBJECT PROPERTY
ASSESSOR'S PARCEL NOS.: 0459-041-241-0-000; 0459-041-23-0-000 AND 0459-041-32-0-000

SURVEYOR OF RECORD

FIELD COMPLETION DATE: MARCH 13, 2021

LICENSED LAND SURVEYOR
Armando D. DuPont
L.S. 7780
Date Signed: 03/16/2021
STATE OF CALIFORNIA

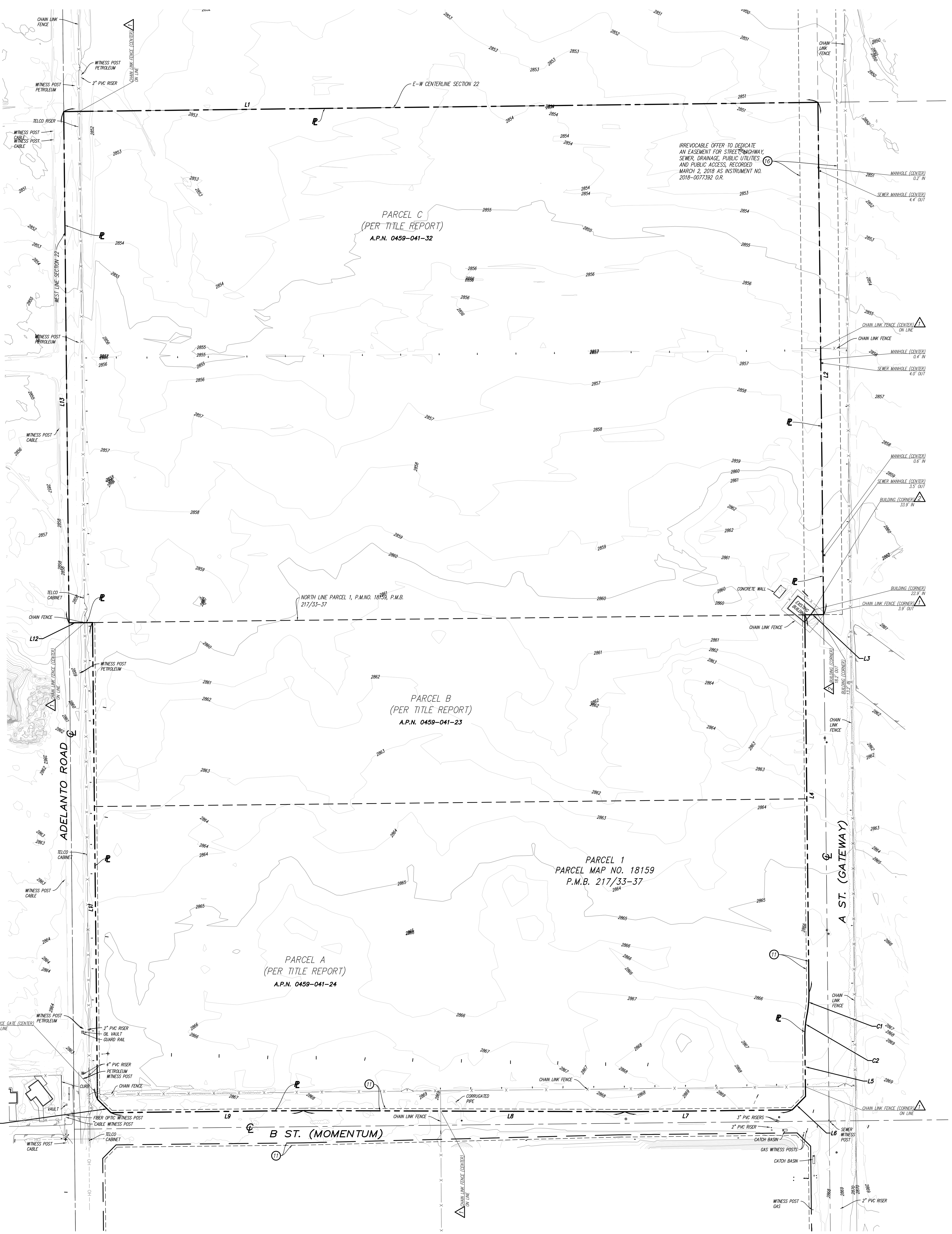
Armando D. DuPont
Registration No. 7780

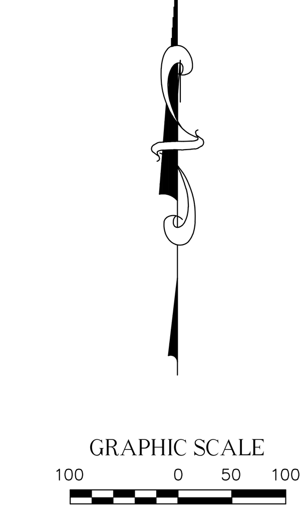
CALVADA SURVEYING, INC.
411 Jenks Cir., Suite 205, Corona, CA 92880
Phone: 951-280-9960 Fax: 951-280-9746
Toll Free: 800-CALVADA www.calvada.com
EST. 1989

JOB NO. 21106

A.L.T.A./N.S.P.S. LAND TITLE SURVEY

PROLOGIS TNS VICTORVILLE
VACANT LAND, VICTORVILLE, CA





LEGEND

	BACK-FLOW VALVE
	CONCRETE PAVEMENT
	FIRE HYDRANT
	FOUND MONUMENT AS NOTED
	GAS VALVE
	GATE
	GUARD POST
	GUY WIRE
	IRRIGATION CONTROL VALVE
	LIGHT STANDARD
	LIGHT STANDARD
	POWER POLE
	POWER POLE W/TRANSFORMER
	POWER POLE W/LIGHT
	SEWER MANHOLE
	SIGN
	STORM DRAIN MANHOLE
	STREET LIGHT
	UTILITY POLE
	WATER VALVE
APN	ASSESSOR'S PARCEL NUMBER
℄	CENTERLINE
ℙ	PROPERTY LINE
R/W	RIGHT OF WAY
	CENTERLINE
	CHAIN LINK FENCE
	CONCRETE/RETAINING WALL
	EASEMENT LINE
	EDGE OF PAVEMENT
	FLOW LINE
	INTERIOR LOT LINE
	MONUMENT LINE
	OVERHEAD LINE
	PROPERTY LINE
	RIGHT-OF-WAY

SCHEDULE B ITEMS

BASED UPON TITLE REPORT NO. 997-30060508-TC1, DATED JANUARY 20, 2021 AS PREPARED BY FIDELITY NATIONAL TITLE COMPANY.

A.- PROPERTY TAXES FISCAL YEAR 2021-2022. **(NOT A SURVEY MATTER).**

B.- PROPERTY TAXES FISCAL YEAR 2020-2021. **(NOT A SURVEY MATTER).**

C.- THE LIEN OF SUPPLEMENTAL OR ESCAPED ASSESSMENTS OF PROPERTY TAXES, IF ANY. **(NOT A SURVEY MATTER).**

1.- WATER RIGHTS, CLAIMS OR TITLE TO WATER, WHETHER OR NOT DISCLOSED BY THE PUBLIC RECORDS. **(NONE NOTED).**

2.- EASEMENT(S) IN FAVOR OF THE PUBLIC OVER ANY EXISTING ROADS LYING WITHIN SAID LAND. **(BLANKET IN NATURE OVER EXISTING ROADS).**

3.- ANY EXISTENCE OF TOXIC OR HAZARDOUS WASTE OF ANY ALLEGED VIOLATION OF ANY LAW, ORDINANCE, OR GOVERNMENTAL REGULATION CONCERNING ENVIRONMENTAL PROTECTION AS DISCLOSED BY THE USES OF THE LAND AS SAME NOW EXISTS ON PORTIONS OF SAID PROPERTY. **(THE EXACT EXTENT, LOCATION, AND USE CANNOT BE DETERMINED FROM THE RECORD.)**

4.- AN EASEMENT FOR TELEPHONE LINES, RECORDED MARCH 14, 1928, IN BOOK 339, PAGE 288 OF O.R. **(THE EXACT LOCATION AND EXTEND OF SAID EASEMENT IS NOT DISCLOSED OF RECORD).**

5.- AN EASEMENT FOR WATER PIPELINE, RECORDED SEPTEMBER 17, 1927 IN BOOK 539, PAGE 280 OF O.R. **(THE EXACT LOCATION AND EXTEND OF SAID EASEMENT IS NOT DISCLOSED OF RECORD).**

6.- DISCREPANCIES, CONFLICTS IN BOUNDARY LINES, SHORTAGE IN AREA, ENCROACHMENTS, OR ANY OTHER MATTERS SHOWN ON MAP IN BOOK 65, PAGE 98 OF RECORDS OF SURVEY.

7.- THE LAND DESCRIBED HEREIN IS INCLUDED WITHIN A PROJECT AREA OF THE VICTOR VALLEY ECONOMIC DEVELOPMENT AUTHORITY, PER DOCUMENT RECORDED JULY 15, 1992, DOC. NO. 92-292935; RECORDED DECEMBER 29, 1993, DOC. NO. 93-565775 AND DECEMBER 19, 2007, DOC. NO. 2007-0403538 ALL OF O.R. **(NOT A SURVEY MATTER).**

8.- AN EASEMENT FOR OVERHEAD AND UNDERGROUND ELECTRICAL SUPPLY SYSTEMS AND COMMUNICATION SYSTEMS, GUYING AND ANCHORAGE SYSTEMS, LIGHTING SYSTEMS, ELECTRICAL PAD SYSTEMS, AND ELECTRIC VAULT SYSTEMS, RECORDED SEPTEMBER 05, 1997, DOC. NO. 97-325581 OF O.R. **(BLANKET IN NATURE).**

9.- COVENANTS, CONDITIONS AND RESTRICTIONS RECORDED SEPTEMBER 05, 1997, DOC. NO. 97-325581 OF O.R. **(AN EASEMENT TO SOUTHERN CALIFORNIA EDISON BLANKET IN NATURE).**

10.- COVENANTS, CONDITIONS, RESTRICTIONS AND EASEMENTS RECORDED MAY 21, 2004, DOC. NO. 2004-0360272 OF O.R. **(NOT PLOTTED - NO EASEMENT SPECIFIED).**

11.- AN EASEMENT FOR PIPELINES, AS DELINEATED ON OR AS OFFERED FOR DEDICATION ON PARCEL MAP NO. 18159, IN BOOK 217, PAGES 33-37 INCLUSIVE OF PARCEL MAPS. **(PLOTTED HEREON).**

12.- MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED THIRD AMENDED AND RESTATED MASTER AGREEMENT RECORDED DECEMBER 01, 2006, DOC. NO. 2006-0813812 OF O.R. **(NOT A SURVEY MATTER).**

13.- MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED FIRST AMENDED AND RESTATED MASTER RAIL DEVELOPMENT AGREEMENT RECORDED DECEMBER 01, 2006, DOC. NO. 2006-0813813 AND DEVELOPMENT AGREEMENT ASSIGNMENT AND ASSUMPTION OF FIRST AMENDED AND RESTATED MASTER RAIL RECORDED DECEMBER 01, 2006, DOC. NO. 2006-0813815 BOTH OF O.R. **(NOT A SURVEY MATTER).**

14.- MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED MEMORANDUM OF DISPOSITION AND DEVELOPMENT AGREEMENT, RECORDED DECEMBER 01, 2006, DOC. NO. 2006-0813816 OF O.R. **(NOT A SURVEY MATTER).**

15.- MATTERS CONTAINED IN THAT CERTAIN DOCUMENT ENTITLED FOURTH AMENDED AND RESTATED MASTER AGREEMENT, RECORDED DECEMBER 27, 2010, DOC. NO. 2010-0545684 OF O.R. **(NOT A SURVEY MATTER).**

16.- AN IRREVOCABLE OFFER TO DEDICATE AN EASEMENT OVER SAID LAND FOR STREET, HIGHWAY, SEWER, DRAINAGE, PUBLIC UTILITIES AND PUBLIC ACCESS, RECORDED MARCH 2, 2018 DOC. NO. 2018-0077392 OF O.R. **(PLOTTED HEREON).**

17.- PLEASE BE ADVISED THAT OUR SEARCH DID NOT DISCLOSE ANY OPEN DEEDS OF TRUST OF RECORD. IF YOU SHOULD HAVE KNOWLEDGE OF ANY OUTSTANDING OBLIGATION, PLEASE CONTACT THE TITLE DEPARTMENT IMMEDIATELY FOR FURTHER REVIEW PRIOR TO CLOSING. **(NOT A SURVEY MATTER).**

18.- ANY RIGHTS OF THE PARTIES IN POSSESSION OF A PORTION OF, OR ALL OF, SAID LAND, WHICH RIGHTS ARE NOT DISCLOSED BY THE PUBLIC RECORDS.
THE COMPANY WILL REQUIRE, FOR REVIEW, A FULL AND COMPLETE COPY OF ANY UNRECORDED AGREEMENT, CONTRACT, LICENSE AND/OR LEASE, TOGETHER WITH ALL SUPPLEMENTS, ASSIGNMENTS AND AMENDMENTS THERETO, BEFORE ISSUING ANY POLICY OF TITLE INSURANCE WITHOUT EXCEPTING THIS ITEM FROM COVERAGE.
THE COMPANY RESERVES THE RIGHT TO EXCEPT ADDITIONAL ITEMS AND/OR MAKE ADDITIONAL REQUIREMENTS AFTER REVIEWING SAID DOCUMENTS. **(NOT A SURVEY MATTER).**

19.- DISCREPANCIES, CONFLICTS IN BOUNDARY LINES, SHORTAGE IN AREA, ENCROACHMENTS, OR ANY OTHER MATTERS WHICH A CORRECT SURVEY WOULD DISCLOSE AND WHICH ARE NOT SHOWN BY THE PUBLIC RECORDS.

20.- ANY EASEMENTS NOT DISCLOSED BY THE PUBLIC RECORDS AS TO MATTERS AFFECTING TITLE TO REAL PROPERTY, WHETHER OR NOT SAID EASEMENTS ARE VISIBLE AND APPARENT. **(NONE NOTED).**

21.- MATTERS WHICH MAY BE DISCLOSED BY AN INSPECTION AND/OR BY A CORRECT ALTA/NSPS LAND TITLE SURVEY OF SAID LAND THAT IS SATISFACTORY TO THE COMPANY, AND/OR BY INQUIRY OF THE PARTIES IN POSSESSION THEREOF.

ZONING RESTRICTIONS

NOTE: INDICATED ZONING INFORMATION IS FROM THE CITY OF VICTORVILLE ZONING ORDINANCES IN EFFECT AS OF THE DATE OF THIS SURVEY. ZONING AND RESTRICTIONS SHOWN HEREON WERE OBTAINED BY A GENERAL REQUEST AT THE PUBLIC COUNTER OF THE ABOVE NAMED DEPARTMENT. NO REPRESENTATION IS MADE FOR THE ACCURACY OR COMPLETENESS OF SAID THIRD PARTY INFORMATION. THIS FIRM IS NOT AN EXPERT IN THE REPRESENTATION OF COMPLEX ZONING ORDINANCES. COMPLIANCE IS BEYOND THE SCOPE OF THIS SURVEY. ANY USER OF SAID INFORMATION IS URGED TO CONTACT THE LOCAL AGENCY DIRECTLY.

ZONE: SP1-92 (SPECIFIC PLAN - LAND USE DESIGNATION - INDUSTRIAL)

MINIMUM SETBACKS: FRONT:
FROM LOCAL OR COLLECTOR STREET: 20 FEET
FROM ARTERIAL STREET: 30 FEET
SIDE: 10 FEET
REAR: 10 FEET

HEIGHT RESTRICTIONS: 55 FEET

POSSIBLE ENCROACHMENT NOTES

THIS IS A LISTING OF OBSERVED IMPROVEMENTS THAT CROSS PROPERTY LINES. STATEMENT OF OWNERSHIP OR POSSESSION IS NOT THE INTENT OF THIS LISTING.

1 FENCE OVERLAPS THE PROPERTY LINE AS SHOWN

2 BUILDING OVERLAPS THE PROPERTY LINE AS SHOWN

ITEMS CORRESPONDING TO TABLE A ITEMS

- ITEM 14
THE NEAREST INTERSECTING STREET TO THE PROPERTY IS ADELANTO ROAD AND B STREET TO THE SOUTH WEST AS SHOWN HEREON AND IT IS ± 90 FEET.

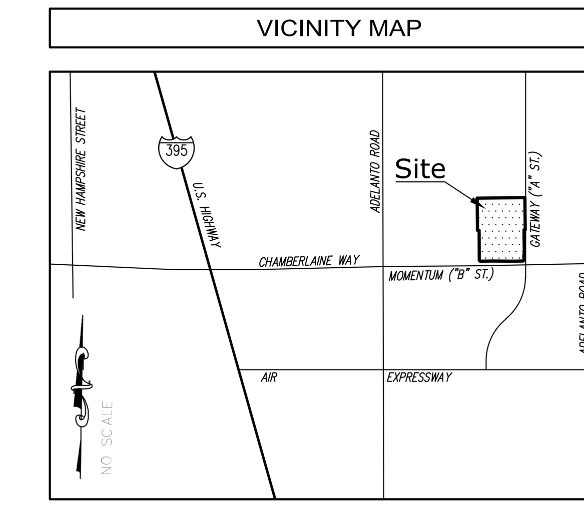
- ITEM 16
NO EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELD WORK.

- ITEM 17
NO EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELD WORK.

FLOOD NOTE: BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE "D" OF THE FLOOD INSURANCE RATE MAP, PANEL NO. 06071C5785H, PANEL DATED 08/28/2008. THIS PROPERTY IS AN UNDETERMINED FLOOD HAZARDS BY FEMA. BY TELEPHONE CALL TO THE NATIONAL FLOOD INSURANCE PROGRAM (800-638-6620) WE HAVE LEARNED THIS COMMUNITY DOES CURRENTLY PARTICIPATE IN THE PROGRAM. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

ZONE D: AREA OF UNDETERMINED FLOOD HAZARD.

VICINITY MAP



LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE CITY OF VICTORVILLE IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCEL A:

PARCEL 1 OF PARCEL MAP NO. 18159, FILED IN BOOK 217, PAGES 33 THROUGH 37 INCLUSIVE OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID SAN BERNARDINO COUNTY, EXCEPT THAT PORTION DESCRIBED AS FOLLOWS:

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EXCEPTING THEREFROM 10% OF THE GROSS FAIR MARKET VALUE OF OIL, GAS, OR MINERALS, AS RESERVED BY THE UNITED STATES OF AMERICA IN DOCUMENT RECORDED MAY 21, 2004 AS INSTRUMENT NO. 2004-0360272 OF OFFICIAL RECORDS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

APN: 0459-041-24-0-000

PARCEL B:

THAT CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, BEING THAT PORTION OF PARCEL 1 OF PARCEL MAP NO. 18159, FILED IN BOOK 217, PAGES 33 THROUGH 37 INCLUSIVE OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID SAN BERNARDINO COUNTY, DESCRIBED AS FOLLOWS:

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EXCEPTING THEREFROM 10% OF THE GROSS FAIR MARKET VALUE OF OIL, GAS, OR MINERALS, AS RESERVED BY THE UNITED STATES OF AMERICA IN DOCUMENTS RECORDED MAY 21, 2004 AS INSTRUMENT NO. 2004-0360272, AND MAY 21, 2004 AS INSTRUMENT NO. 2004-0360273, BOTH OF OFFICIAL RECORDS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

APN: 0459-041-23-0-000

PARCEL C

THAT PORTION OF SECTION 22 OF TOWNSHIP 6 NORTH, RANGE 5 WEST, SAN BERNARDINO MERIDIAN, IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, BEING A PORTION OF THAT LAND CONVEYED TO SOUTHERN CALIFORNIA LOGISTICS AIRPORT AUTHORITY BY DOCUMENT RECORDED MAY 21, 2004 AS INSTRUMENT NO. 2004-0360272 OF OFFICIAL RECORDS OF THE COUNTY RECORDER OF SAID COUNTY, DESCRIBED AS FOLLOWS:

COMMENCING AT THE INTERSECTION OF THE CENTERLINE OF "A" STREET AND "B" STREET AS SHOWN ON PARCEL MAP NO. 18159, FILED IN BOOK 217, PAGES 33 THROUGH 37 INCLUSIVE OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND SAID CENTERLINE OF "B" STREET ALSO BEING THE SOUTH LINE OF WEST HALF OF SAID SECTION 22 AS SHOWN ON SAID PARCEL MAP; THENCE NORTH 00°37'56" WEST ALONG SAID THE CENTERLINE OF "A" STREET 1319.00 FEET TO A POINT OF INTERSECTION WITH THE EASTERLY PROLONGATION OF THE NORTHERLY LINE OF PARCEL 1 OF SAID PARCEL MAP NO. 18159, AND SAID POINT BEING THE TRUE POINT OF BEGINNING; THENCE CONTINUING ALONG THE PROLONGATION OF SAID CENTERLINE OF "A" STREET NORTH 00°37'56" WEST 1334.49 FEET TO THE EAST-WEST CENTER SECTION LINE OF SAID SECTION 22; THENCE SOUTH 89°17'39" WEST 1965.71 FEET ALONG SAID EAST-WEST CENTERLINE TO THE WEST LINE OF SAID SECTION 22; THENCE SOUTH 00°35'57" EAST 1331.56 FEET ALONG SAID WEST LINE TO A POINT OF INTERSECTION WITH THE WESTERLY PROLONGATION OF SAID NORTHERLY LINE OF PARCEL 1; THENCE NORTH 89°22'46" EAST 1966.48 FEET ALONG SAID PROLONGATION TO THE TRUE POINT OF BEGINNING.

EXCEPT THEREFROM, AN OVERRIDING ROYALTY OF 10% OF THE GROSS FAIR MARKET VALUE OF OIL, GAS, OR MINERAL EXTRACTED FROM THE PROPERTY AS SET FORTH IN THE DOCUMENT RECORDED MAY 21, 2004 AS INSTRUMENT NO. 2004-0360272 OF OFFICIAL RECORDS.

APN: 0459-041-32-0-000

ITEMS CORRESPONDING TO TABLE A ITEMS

- ITEM 14
THE NEAREST INTERSECTING STREET TO THE PROPERTY IS ADELANTO ROAD AND B STREET TO THE SOUTH WEST AS SHOWN HEREON AND IT IS ± 90 FEET.

- ITEM 16
NO EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELD WORK.

- ITEM 17
NO EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELD WORK.

SURVEYOR'S NOTES

- THE UTILITIES SHOWN HEREON ARE BASED ON OBSERVED EVIDENCE ONLY. THIS SURVEY WOULD NOT SHOW UTILITIES COVERED BY CARS/TRUCKS OR RECENTLY PAVED ASPHALT/CONCRETE OR OVERGROWN BRUSH, TREES AND SHRUBS.
- THIS SURVEY HAS BEEN PREPARED FOR TITLE INSURANCE PURPOSES ONLY. THIS SURVEY DOES NOT CONTAIN SUFFICIENT DETAIL FOR DESIGN PURPOSES. THE BOUNDARY DATA AND TITLE MATTERS AS SHOWN HEREON HAVE BEEN DEVELOPED FROM THE REFERENCED TITLE REPORT.
- UNLESS THIS PLAN HAS THE SEAL AND SIGNATURE OF THE SURVEYOR AND/OR ENGINEER RESPONSIBLE FOR ITS PREPARATION, THIS IS NOT AN AUTHENTIC COPY OF THE ORIGINAL SURVEY AND SHALL NOT BE DEEMED RELIABLE.

SURVEYOR'S CERTIFICATE

TO STIRLING CAPITAL INVESTMENTS/LOT 44, LLC, A DELAWARE LIMITED LIABILITY COMPANY AND FIDELITY NATIONAL TITLE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1 (FOUND MONUMENTS ONLY), 2, 3, 4, 5, 6(a), 7(a), 7(b)(1), 7(c), 8, 9, 10, 11(a) (VISIBLE EVIDENCE ONLY), 13, 14, 16, 17, 18 AND 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON MARCH 13, 2021.

DATE OF PLAT OR MAP: MARCH 16, 2021.

REVISIONS

NO.	DATE	REVISIONS	BY
0	03/16/21	SUBMITTAL	CE

UTILITY STATEMENT

BURIED UTILITIES AND/OR PIPELINES SHOWN HEREON ARE PER VISIBLE AND APPARENT SURFACE EVIDENCE, RECORD DRAWINGS OF THE CONSTRUCTED UTILITY LINES OBTAINED FROM RELIABLE AND RESPONSIBLE SOURCES NOT CONNECTED WITH CALVADA SURVEYING, INC. OR MARKINGS PROVIDED BY AN INDEPENDENT LOCATING CONTRACTOR. NO GUARANTEE OR WARRANTY, EITHER EXPRESSED OR IMPLIED, IS MADE AS TO THE ACCURACY OR THOROUGHNESS OF SUCH INFORMATION. IF MORE ACCURATE LOCATIONS OF UNDERGROUND UTILITIES OR PIPE LINES ARE REQUIRED, THE UTILITY OR PIPELINE WILL HAVE TO BE VERIFIED BY FIELD POTHOLING. CALVADA SURVEYING, INC. AND THE SURVEYOR OF RECORD SHALL NOT BE HELD LIABLE FOR THE LOCATION OF OR THE FAILURE TO NOTE THE LOCATION OF NON-VISIBLE UTILITIES OR PIPELINES.

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

PREPARED FOR

LANGAN
LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC.
18575 JAMBOREE ROAD, SUITE 150
IRVINE, CA 92612

PHONE: (949) 561-9200
FAX: (949) 561-9201

BASIS OF BEARINGS

THE BEARINGS SHOWN HEREON ARE BASED UPON THE CALIFORNIA COORDINATE SYSTEM OF 1983, CCS83, ZONE 5, (2017.50) IN ACCORDANCE TO THE CALIFORNIA PUBLIC RESOURCES CODE SECTIONS 8801-8819; SAID BEARINGS ARE DETERMINED LOCALLY UPON FIELD-OBSERVED TIES TO THE FOLLOWING CALIFORNIA SPATIAL REFERENCE NETWORK CONTINUOUS OPERATING REFERENCE STATIONS (C.O.R.S.):

C.S.R.C. SCIA:
NORTHING = 2044003.43' EASTING = 6745730.79'

C.S.R.C. P586:
NORTHING = 2017796.62' EASTING = 6778350.58'

THE COMBINATION FACTOR FOR THIS PROJECT WAS APPLIED AT THE FOLLOWING POINT:
NORTHING = 6743342.69' EASTING = 2039097.89'

MAPPING ANGLE = -1°19'48.87" SCALE FACTOR = 1.000020575.

BENCHMARK

ELEVATIONS SHOWN HEREON ARE BASED UPON CITY OF VICTORVILLE BENCHMARK Y-747, ELEVATION 2905.31 FEET (NGVD 29).

DESCRIPTION: 8"X8" CONCRETE MONUMENT W/4" IRON CAP STAMPED "USC&GS BM Y-747, 1945" @ 41' S/O AIREXPRESSWAY AND 93' W/O NEVADA AVE EXTENSION

SITE INFORMATION

SITE NAME: PROLOGIS TNS VICTORVILLE
SITE ADDRESS: VACANT LAND VICTORVILLE, CA

PROPERTY AREA:
GROSS: 114.753 AC. OR 4,998,623 SQ. FT.
NET: (EXCLUDING EASEMENT 16 (GATEWAY)) 113.252 AC. OR 4,933,239 SQ. FT.

TOTAL GROUND FLOOR AREA OF BUILDINGS: NO BUILDINGS / VACANT LAND

PARKING COUNT: NO STRIPED PARKING STALLS ON SUBJECT PROPERTY
ASSESSOR'S PARCEL NOS.: 0459-041-241-0-000; 0459-041-23-0-000 AND 0459-041-32-0-000

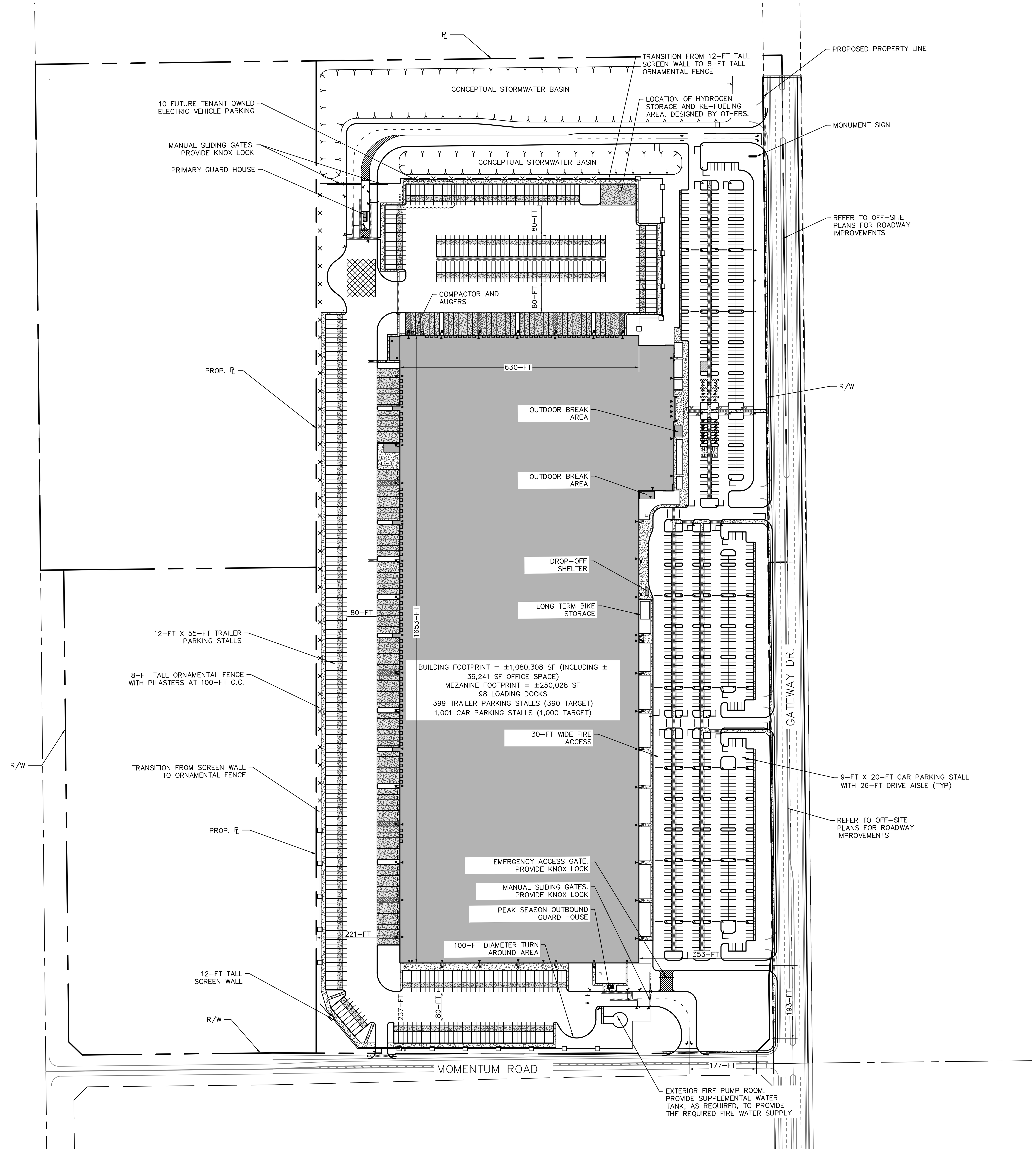
SURVEYOR OF RECORD

FIELD COMPLETION DATE: MARCH 13, 2021

LICENSED LAND SURVEYOR
Armando D. DuPont
L.S. 7780
Date Signed: 03/16/2021
STATE OF CALIFORNIA

Armando D. DuPont
Registration No. 7780

CALVADA SURVEYING, INC.
411 Jenks Cir., Suite 205, Corona, CA 92880
Phone: 951-280-9960 Fax: 951-280-9746
Toll Free: 800-CALVADA www.calvada.com
EST. 1989 JOB NO. 21106



LEGEND

	EXISTING	PROPOSED
8-FT ORNAMENTAL FENCE WITH PILASTERS		-x-x-x-x-x-
12-FT TALL SCREEN WALL		
DETENTION BASIN		
PROPERTY LINE		
OUTDOOR BREAK AREA		

PARKING SUMMARY:

CAR PARKING PROVIDED (9FT X 20FT): 1,020
CAR PARKING REQUIRED BY CITY CODE (9FT X 20FT): 363*
COMPLIES?: YES

*BASED ON "WHOLESALE AND WAREHOUSE USES INCLUDING SPECULATIVE BUILDINGS, INCLUDING DISTRIBUTION CENTERS" AS REQUIRED PER TABLE 4.6 OF SOUTHERN CALIFORNIA LOGISTICS AIRPORT (SCLA) SPECIFIC PLAN

Off-Street Parking and Loading Requirements

Manufacturing or industrial plant, storage building or yard, industrial laboratory or similar uses	1 space for each employee during the highest shift change	1 space for each 300 sq. ft. of administrative area
Mini-warehouse	1 space per 300 sq. ft. of office area	2 spaces for an accessory residence
Wholesale and warehouse uses including speculative buildings	1 space per 1,000 sq. ft. of the first 40,000 sq. ft. and 1 space per 4,000 sq. ft. for the portion over 40,000 sq. ft.	1 space for each 300 sq. ft. of administrative area

GFA, INCLUDING MEZZ: 1,330,336 SF

PARKING REQUIRED:
1ST 40,000SF – 40 STALLS
OVER 40,000 SF – 323 STALLS

TOTAL REQUIRED: 363 STALLS

150 0 75 150
SCALE: 1 INCH = 150 FEET

Signature Date
MICHAEL GOLIAS
PROFESSIONAL ENGINEER CA LIC. No.: C91029

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CITY OF VICTORVILLE
ENGINEERING DEPARTMENT
14343 CIVIC DRIVE, VICTORVILLE, CA. 92392 (760) 955-5158

NO.	REVISIONS	BY	DATE

FIELD BOOK NO. (S)

CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
OVERALL SITE PLAN

BENCH MARK:
CITY OF VICTORVILLE BENCHMARK Y-747
ELEVATION = 2905.31' (NVGD 29)
8"x8" CONCRETE MONUMENT W/4" IRON CAP
STAMPED "USC&GS BM Y-747, 1945" @ 41' S/O AIREXPRESSWAY AND 93' W/O NEVADA AVE EXTENSION

DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 03/25/2021

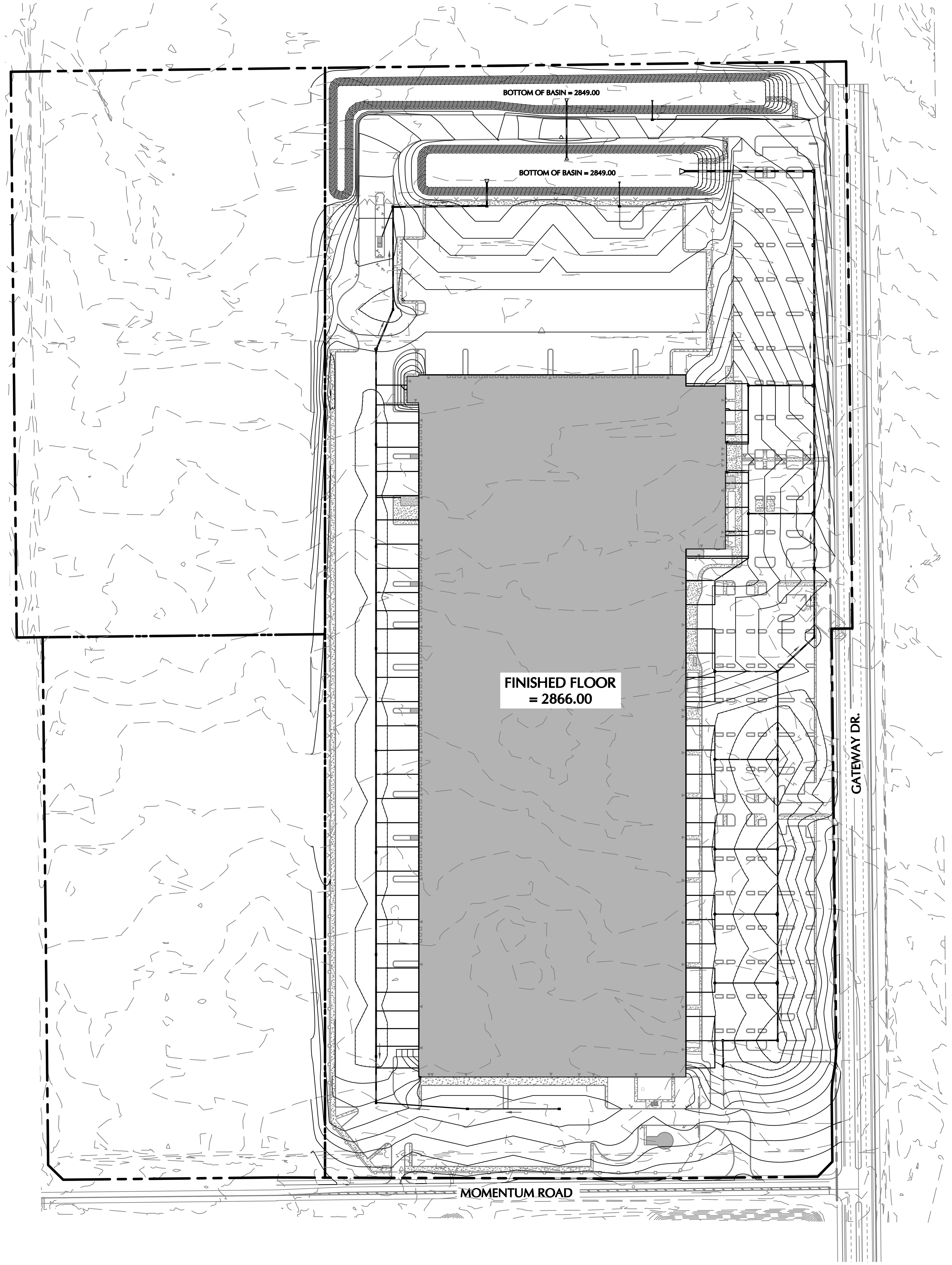
SHEET NO. 3 OF 36

DRAWING NO. CS100

PROJECT NO. PSUB20-00022

APPROVED BY: CITY ENGINEER ______ DATE: ______ R.C.E. ______ EXP.

Date: 3/29/2021 Time: 12:01 User: amlu Style Table: Langan.stb Layout: 3 Document Code: 700089101-0301-CS101-0103



LEGEND

	EXISTING	PROPOSED
CONTOUR	632	634
SPOT ELEVATION		632.64
BOTTOM OF CURB ELEVATION		BC632.71
STORM PIPE		

GRADING NOTES:

1. GRADING SHALL CONFORM TO SECTION 15.06 OF THE CITY OF VICTORVILLE MUNICIPAL CODE.
2. A GRADING PERMIT SHALL BE OBTAINED FROM THE CITY OF VICTORVILLE BUILDING DEPARTMENT PRIOR TO THE START OF GRADING WORK.
3. CONTRACTOR SHALL GIVE THE CITY OF VICTORVILLE ENGINEERING DEPARTMENT AT LEAST 2 WORKING DAYS NOTICE TO SCHEDULE A PRE–CONSTRICTION MEETING WITH THE INSPECTION PRIOR TO THE START OF WORK.
4. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT AT 1 (800) 422–4133 AT LEAST 2 WORKING DAYS IN ADVANCE OF STARTING WORK.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE HIMSELF/HERSELF WITH SITE CONDITIONS AND OF ANY UNDERGROUND UTILITIES SHOWN OR NOT SHOWN ON THESE PLANS.
6. THE CONTRACTOR SHALL GIVE THE CITY OF VICTORVILLE ENGINEERING DEPARTMENT AT LEAST 1 WORKING DAY NOTICE PRIOR TO ALL INSPECTIONS AT (760) 955–5158. A RE–INSPECTION FEE WILL BE RENDERED ON EACH OCCASION WHEN THE CONTRACTOR IS NOT READY FOR THE INSPECTION AT THE SCHEDULED TIME. NO FURTHER INSPECTIONS WILL BE PERFORMED UNTIL SAID RE–INSPECTION FEE IS PAID.
7. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROTECT SURVEYING MOMENTS IN PLACE AND THE CONTRACTOR SHALL BE FINANCIALLY RESPONSIBLE FOR RESETTING DAMAGED OR DESTROYED MONUMENTS.
8. JOSHUA TREES SHALL BE PROTECTED IN PLACE OR REPLACED AS APPROVED BY THE PARKS DIVISION OF THE CITY OF VICTORVILLE DEPARTMENT OF COMMUNITY SERVICES AT THE CONTRACTOR'S EXPENSE.
9. NO GRADING SHALL COMMENCE PRIOR TO 7:00 A.M. EACH WORKING DAY.
10. DUST CONTROL SHALL INCLUDE:
    a. PROVISIONS FOR CONTINUOUS WATERING DURING GRADING OPERATIONS INCLUDING A 24–HOUR ON CALL OPERATOR OR AS DIRECTED BY CITY STAFF.
    b. UPON COMPLETION OF THE PROJECT, THE ENTIRE SITE IS TO BE STABILIZED BY TREATING WITH MAGNESIUM CHLORIDE OR OTHER APPROVCED METHOD AND AS APPROVED BY CITY STAFF.
11. CLEAR ALL CUT AND FILL AREAS OF VEGETATION AND ORGANIC MATERIALS TO A DEPTH OF SIX (6) INCHES OR MORE.
12. FILL SHALL BE PLACED IN LIFTS OF EITHER (8) INCHES OR LESS AND SUFFICIENT MOISTURE ADDED AND MATERIAL COMPACTED TO ACHIEVE THE REQUIRED PERCENT OF COMPACTION.
13. NO ROCKS GREATER THAN SIX (6) INCHES IN DIAMETER MAY BE PLACED IN FILL.
14. COMPACTION SHALL BE A MINIMUM OF NINETY PERCENT (90%).
15. MINIMUM SLOPE FOR ALL GRADED AREAS SHALL BE ONE PERCENT (1.00%) UNLESS ON SMOOTH PCC, THEN THE MINIMUM SLOPE SHALL BE ONE–HALF PERCENT (0.50%).
16. MAXIMUM SLOPES SHALL BE 2:1. SLOPE STABILIZATION SHALL BE PROVIDED ON ALL SLOPES IN ACCORDANCE WITH SECTION 3316 OF THE UNIFORM BUILDING CODE.
17. ALL OFF–SITE IMPROVEMENTS SHALL BE CONSTRUCTION TO CITY OF VICTORVILLE STANDARDS
18. ALL FENCES AND WALLS ARE UNDER SEPARATE PERMIT.
19. RETAINING WALLS SHALL BE CONSTRUCTED TO CITY OF VICTORVILLE STANDARDS OR WALL CALCULATIONS SUBMITTED TO THE BUILDING DEPARTMENT FOR CITY APPROVAL.
20. BUILDING PAD AND GRADING PLAN CERTIFICATION SHALL BE COMPLETED BY A LICENSED ENGINEER IN ACCORDANCE WITH SECTION 3317 OF THE UNIFORM BUILDING CODE.
21. THE MAXIMUM ALLOWABLE FOUNDATION BEARING PRESSURE SHALL BE 1500 PSF UNLESS APPROVED BY THE CITY OF VICTORVILLE BUILDING DEPARTMENT.
22. THE CONTRACTOR SHALL COMPLY WITH THE GRADING ORDINANCE SECTION 15.06.080 AND SECTION 15.06.090 AS IT RELATED TO BORROW PITS, EXPORT SITES AND HAUL ROUTES PRIOR TO ISSUANCE OF A GRADING PERMIT.
23. A PALEONTOLOGICAL MONITOR MUST BE PRESENT DURING ALL PHASES OF GRADING WHEN REQUIRED BY CITY STAFF.
24. APPROXIMATE QUANTITIES:
    CUT: 123,500 CY
    FILL: 290,000 CY
25. CONSTRUCTION ACTIVITIES OOF ONE (1) ACRE OR MORE SHALL REQUIRE A GENERAL CONSTRUCTION STORM WATER PERMIT. FOR MORE INFORMATION, YOU MAY CALL THE STATE WATER RESOURCES CONTROL BOARD – DIVISION OF WATER QUALITY AT (916) 657–1146.
26. ALL GRADING SHALL COMPLY WITH THE GRADING PLAN AND THE RECOMMENDATIONS SET FORTH IN THE SOILS REPORT.

150 0 75 150
SCALE: 1 INCH = 150 FEET

NOT FOR CONSTRUCTION

Signature Date

MICHAEL GOLIAS
PROFESSIONAL ENGINEER CA LIC. No.: C91029

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Langan Engineering and Environmental Services, Inc.
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CITY OF VICTORVILLE
ENGINEERING DEPARTMENT
14343 CIVIC DRIVE, VICTORVILLE, CA. 92392 (760) 955–5158

NO.	REVISIONS	BY	DATE

FIELD BOOK NO. (S)

CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
OVERALL CONCEPTUAL GRADING & DRAINAGE PLAN

BENCH MARK:
CITY OF VICTORVILLE BENCHMARK Y–747
ELEVATION = 2905.31' (NVGD 29)
8"x8" CONCRETE MONUMENT W/4" IRON CAP
STAMPED "USC&GS BM Y–747, 1945" @ 41' S/O
AIREXPRESSWAY AND 93' W/O NEVADA AVE EXTENSION

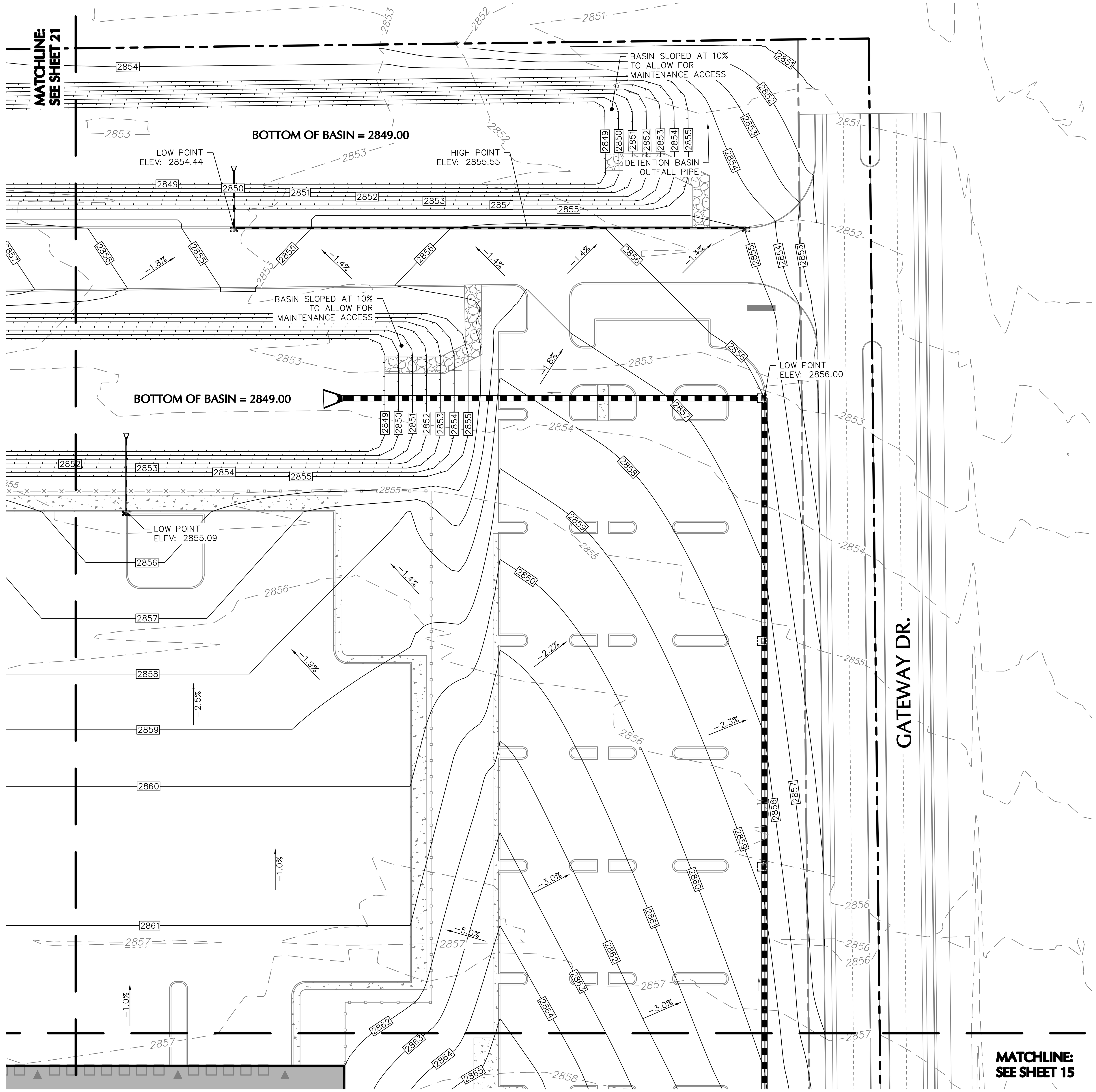
DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 04/02/2021

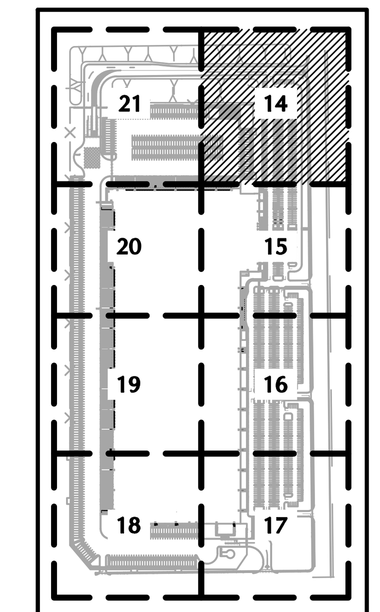
SHEET NO. 13 OF 36

DRAWING NO. CG100

PROJECT NO. PSUB20–00022

APPROVED BY: CITY ENGINEER ______ DATE: ______ R.C.E. ______ EXP.





KEY MAP

LEGEND

	EXISTING	PROPOSED
CONTOUR	632	634
SPOT ELEVATION		632.64
BOTTOM OF CURB ELEVATION		BC632.71
STORM PIPE		

40 0 10 25 40
SCALE 1 INCH = 40 FEET

NOT FOR CONSTRUCTION

Signature
Date
MICHAEL GOLIAS
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NO.	REVISIONS	BY	DATE

FIELD BOOK NO. (S)

CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
PARTIAL CONCEPTUAL GRADING & DRAINAGE PLAN

BENCH MARK:
CITY OF VICTORVILLE BENCHMARK Y-747
ELEVATION = 2905.31' (NVGD 29)
8"x8" CONCRETE MONUMENT W/4" IRON CAP
STAMPED "USC&GS BM Y-747, 1945" @ 41' S/O
AIREXPRESSWAY AND 93' W/O NEVADA AVE EXTENSION

DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 04/02/2021

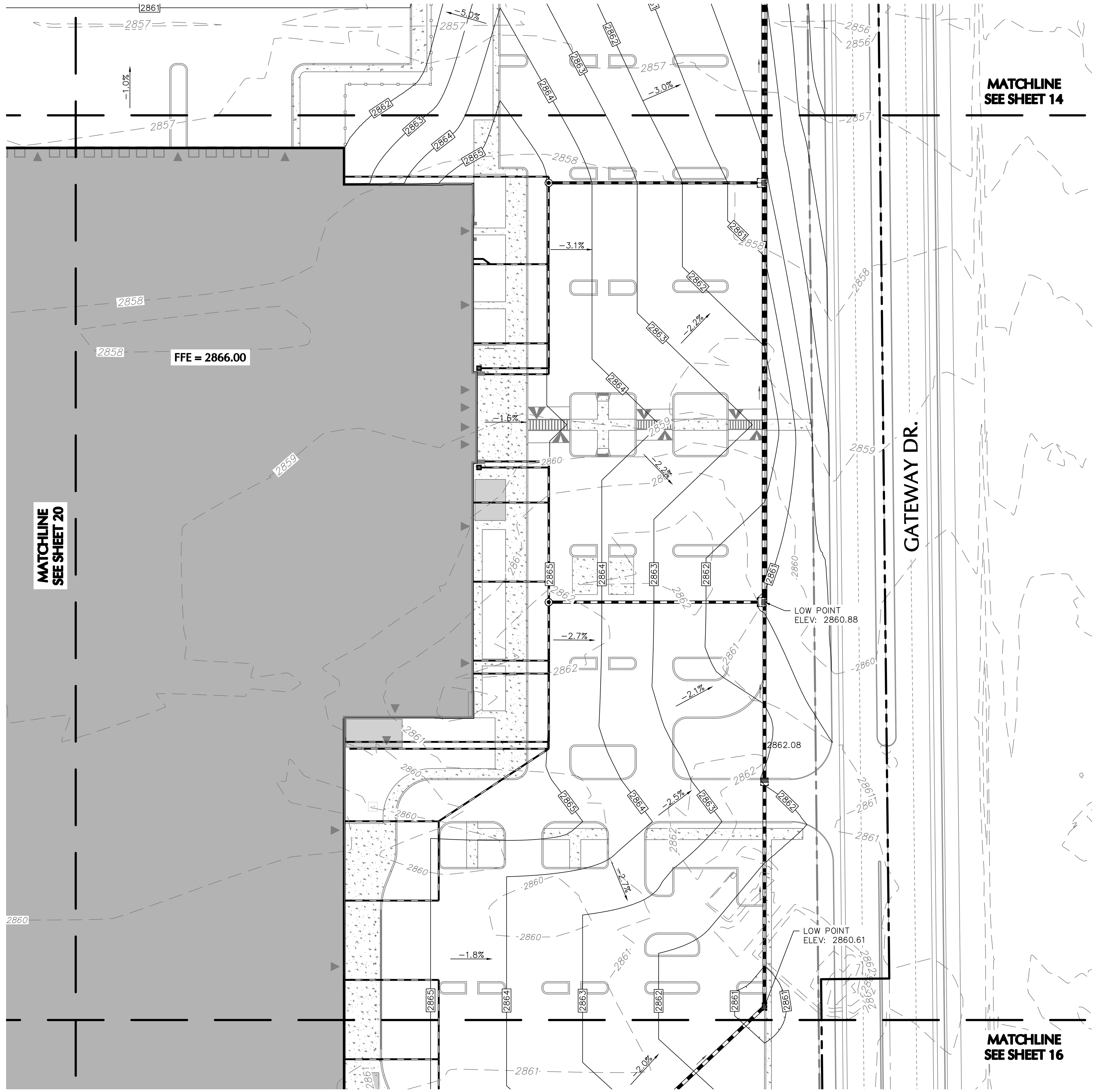
SHEET NO. 14 OF 36

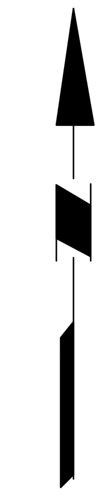
DRAWING NO. CG101

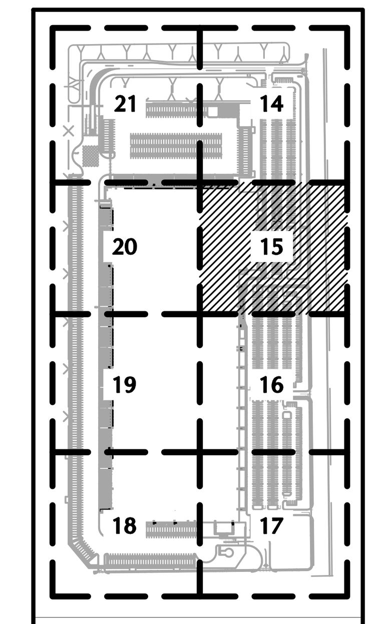
PROJECT NO. PSUB20-00022

APPROVED BY: CITY ENGINEER ________ DATE: ________ R.C.E. ________ EXP.

Date: 4/1/2021 Time: 15:41 User: amlu Style Table: Langan.stb Layout: 14 Document Code: 700089101-0301-CG101-0101







KEY MAP

LEGEND

	EXISTING	PROPOSED
CONTOUR	632	634
SPOT ELEVATION		632.64
BOTTOM OF CURB ELEVATION		BC632.71
STORM PIPE		

40 0 10 25 40
SCALE 1 INCH = 40 FEET

NOT FOR CONSTRUCTION

Signature | Date

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NO.	REVISIONS	BY	DATE

FIELD BOOK NO. (S)

CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
PARTIAL CONCEPTUAL GRADING & DRAINAGE PLAN

BENCH MARK:
CITY OF VICTORVILLE BENCHMARK Y-747
ELEVATION = 2905.31' (NVGD 29)
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STAMPED "USC&GS BM Y-747, 1945" @ 41' S/O
AIREXPRESSWAY AND 93' W/O NEVADA AVE EXTENSION

DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 04/02/2021

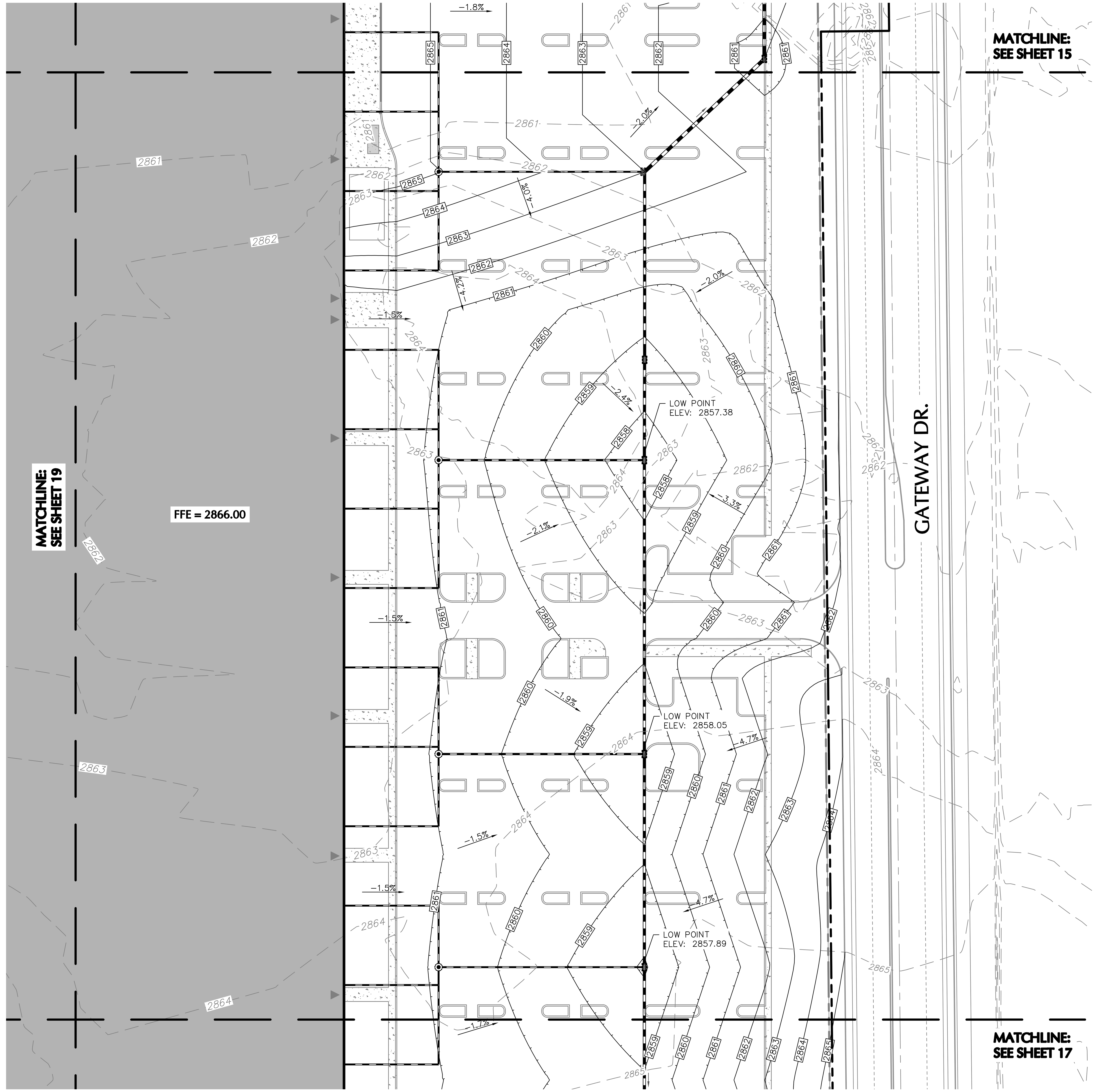
SHEET NO. 15 OF 36

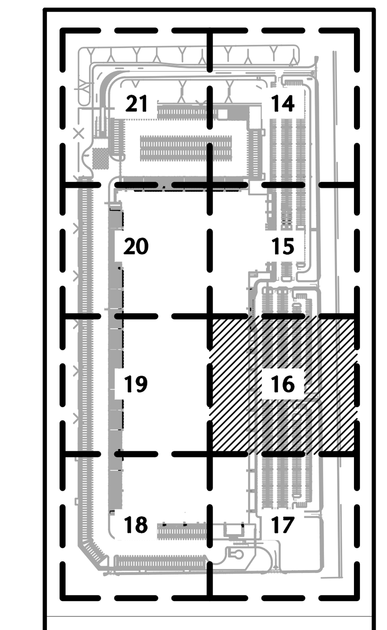
DRAWING NO. CG102

PROJECT NO. PSUB20-00022

APPROVED BY: CITY ENGINEER ______ DATE: ______ R.C.E. ______ EXP.

Date: 4/1/2021 Time: 15:41 User: amlu Style Table: Langan.stb Layout: 15 Document Code: 700089101-0301-CG101-0101





KEY MAP

LEGEND

	EXISTING	PROPOSED
CONTOUR	632	634
SPOT ELEVATION		632.64
BOTTOM OF CURB ELEVATION		BC632.72
STORM PIPE		

40 0 10 25 40
SCALE 1 INCH = 40 FEET

NOT FOR CONSTRUCTION

Signature Date
MICHAEL GOLIAS
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14343 CIVIC DRIVE, VICTORVILLE, CA. 92392 (760) 955-5158

NO.	REVISIONS	BY	DATE

FIELD BOOK NO. (S)

CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
PARTIAL CONCEPTUAL GRADING & DRAINAGE PLAN

BENCH MARK:
CITY OF VICTORVILLE BENCHMARK Y-747
ELEVATION = 2905.31' (NVGD 29)
8"x8" CONCRETE MONUMENT W/4" IRON CAP
STAMPED "USC&GS BM Y-747, 1945" @ 41' S/O
AIREXPRESSWAY AND 93' W/O NEVADA AVE EXTENSION

DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 04/02/2021

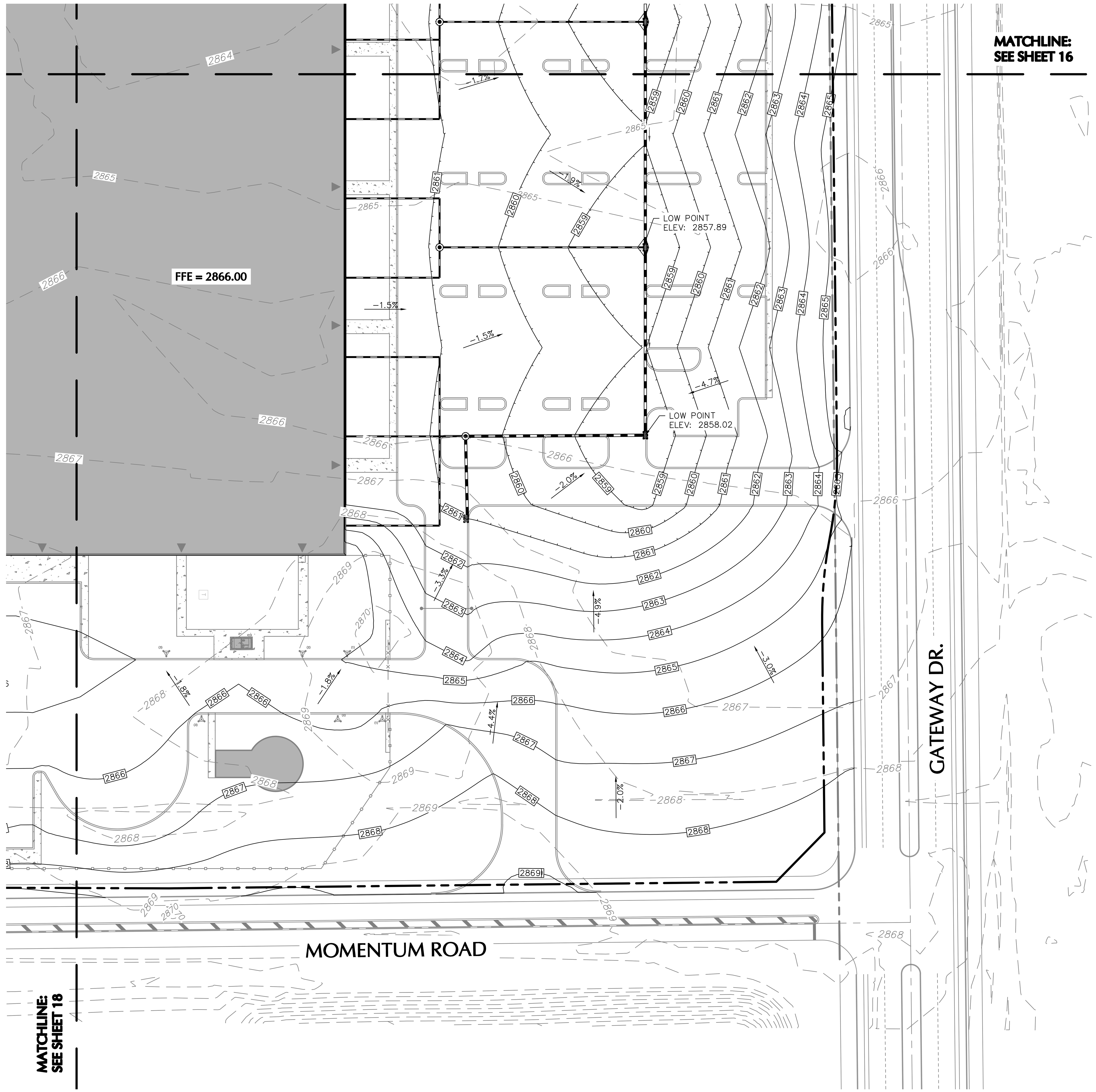
SHEET NO. 16 OF 36

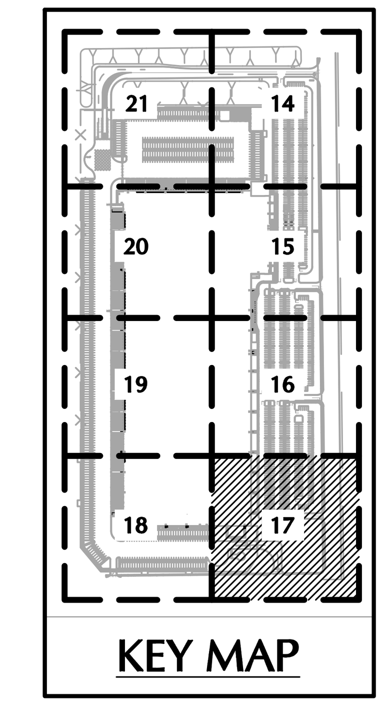
DRAWING NO. CG103

PROJECT NO. PSUB20-00022

APPROVED BY: CITY ENGINEER ______ DATE: ______ R.C.E. ______ EXP.

Date: 4/1/2021 Time: 15:41 User: amlu Style Table: Langan.stb Layout: 16 Document Code: 700089101-0301-CG101-0101





LEGEND

	EXISTING	PROPOSED
CONTOUR	632	634
SPOT ELEVATION		632.64
BOTTOM OF CURB ELEVATION		BC632.75
STORM PIPE		

SCALE 1 INCH = 40 FEET

NOT FOR CONSTRUCTION

Signature | Date

MICHAEL GOLIAS
PROFESSIONAL ENGINEER CA LIC. No.: C91029

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NO.	REVISIONS	BY	DATE

FIELD BOOK NO. (S)

CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
PARTIAL CONCEPTUAL GRADING & DRAINAGE PLAN

BENCH MARK:
CITY OF VICTORVILLE BENCHMARK Y-747
ELEVATION = 2905.31' (NVGD 29)
8"x8" CONCRETE MONUMENT W/4" IRON CAP
STAMPED "USC&GS BM Y-747, 1945" @ 41' S/O
AIREXPRESSWAY AND 93' W/O NEVADA AVE EXTENSION

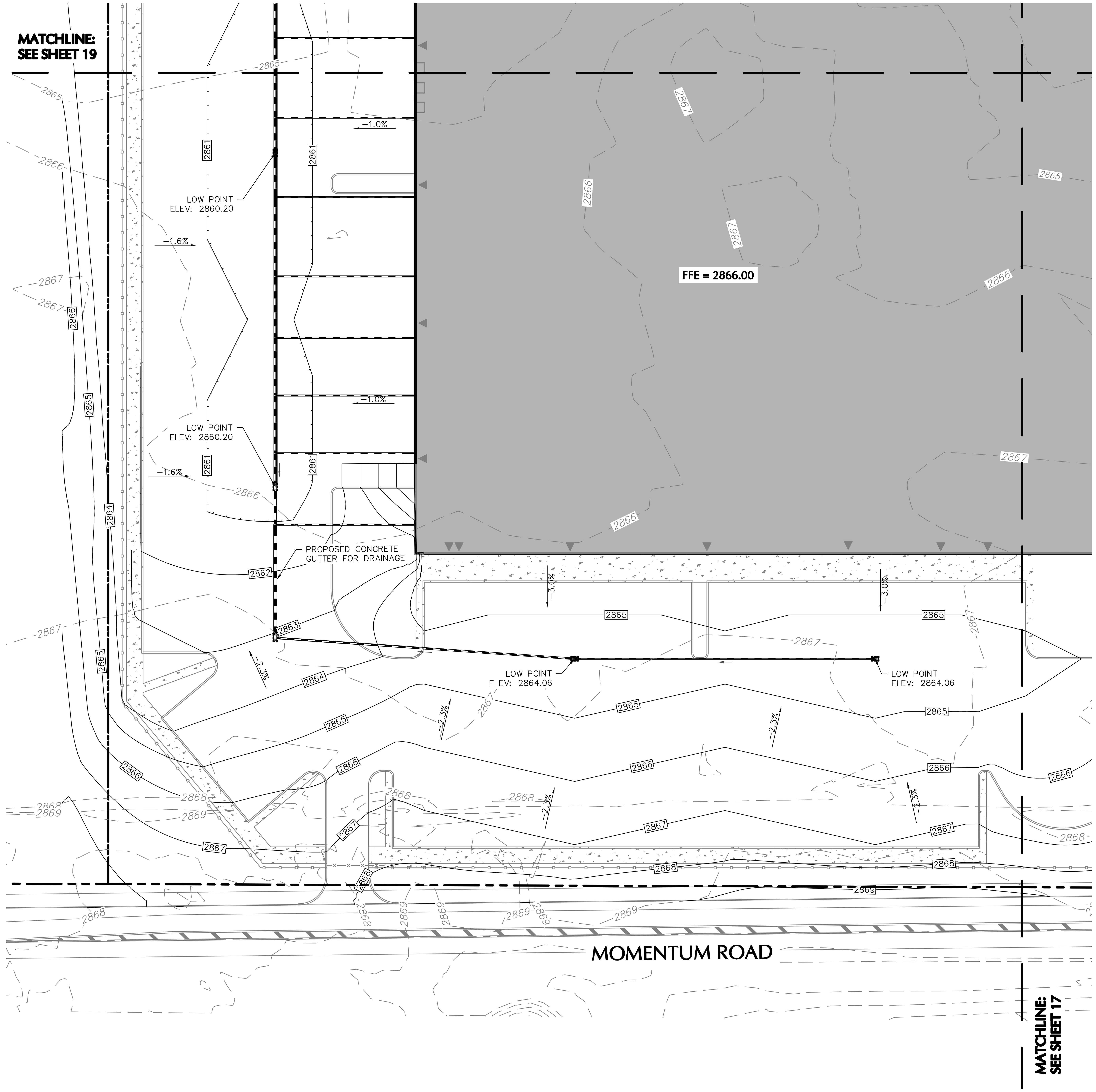
DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 04/02/2021

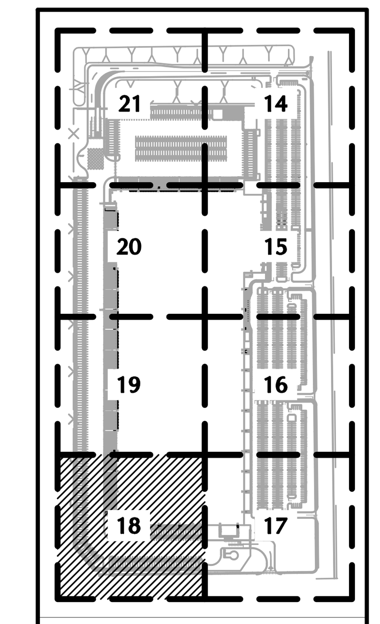
SHEET NO. 17 OF 36

DRAWING NO. CG104

PROJECT NO. PSUB20-00022

APPROVED BY: CITY ENGINEER ____ DATE: ____ R.C.E. ____ EXP.





KEY MAP

LEGEND

	EXISTING	PROPOSED
CONTOUR	632	634
SPOT ELEVATION		632.64
BOTTOM OF CURB ELEVATION		BC632.72
STORM PIPE		

40 0 10 25 40
SCALE 1 INCH = 40 FEET

NOT FOR CONSTRUCTION

Signature Date
MICHAEL GOLIAS
PROFESSIONAL ENGINEER CA LIC. No.: C91029

LANGAN
Langan Engineering and Environmental Services, Inc.
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CITY OF VICTORVILLE
ENGINEERING DEPARTMENT
14343 CIVIC DRIVE, VICTORVILLE, CA. 92392 (760) 955-5158

NO.	REVISIONS	BY	DATE

FIELD BOOK NO. (S)

BENCH MARK:
CITY OF VICTORVILLE BENCHMARK Y-747
ELEVATION = 2905.31' (NVGD 29)
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AIREXPRESSWAY AND 93' W/O NEVADA AVE EXTENSION

CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
PARTIAL CONCEPTUAL GRADING & DRAINAGE PLAN

DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 04/02/2021

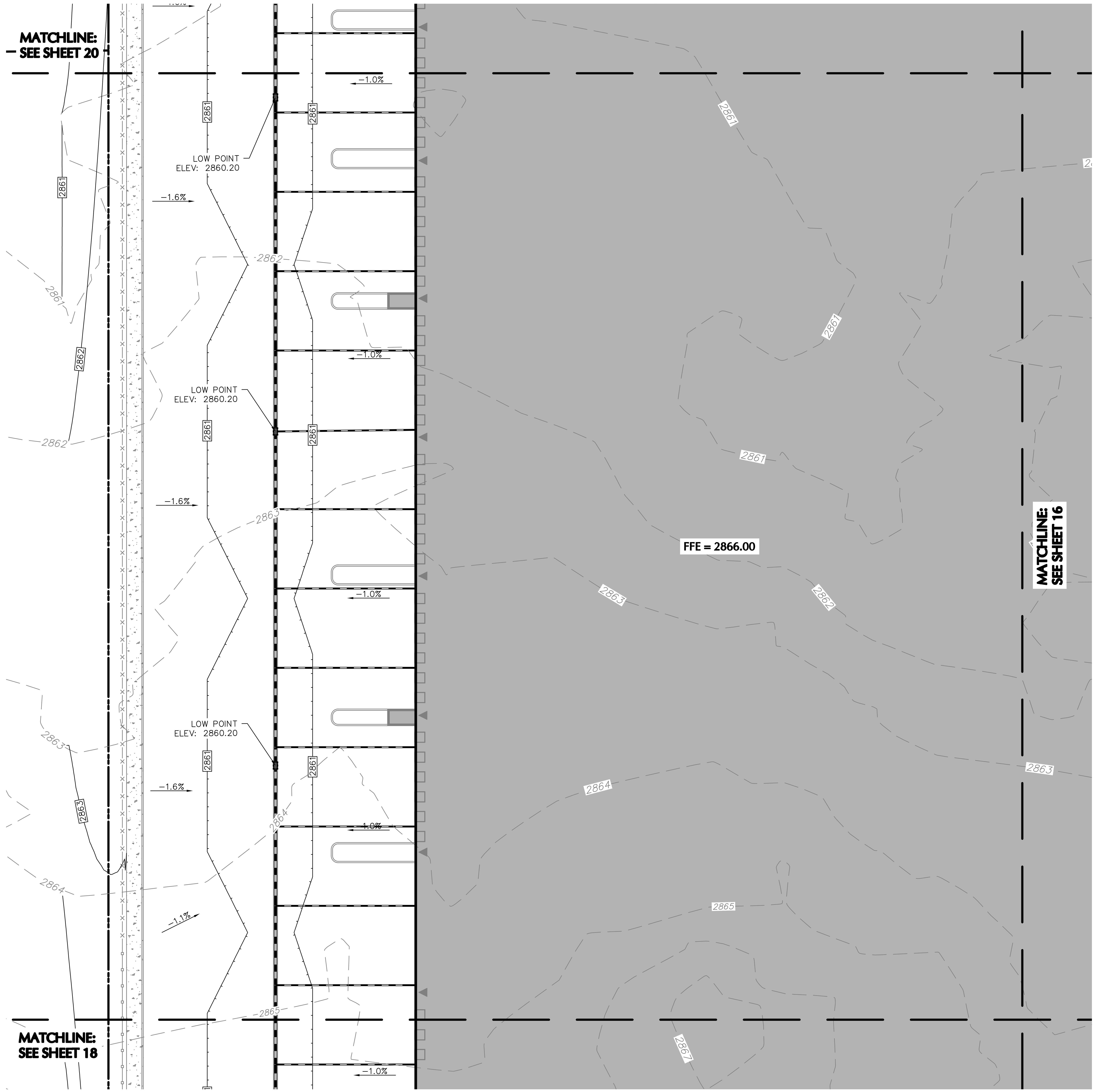
SHEET NO. 18 OF 36

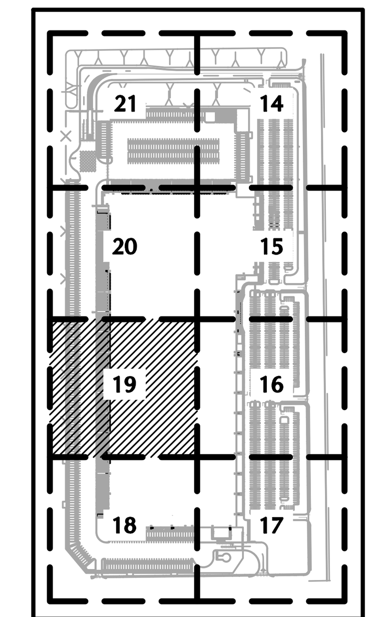
DRAWING NO. CG105

PROJECT NO. PSUB20-00022

APPROVED BY: CITY ENGINEER ____ DATE: ____ R.C.E. ____ EXP.

Date: 4/1/2021 Time: 15:41 User: amlu Style Table: Langan.stb Layout: 18 Document Code: 700089101-0301-CG101-0101





KEY MAP

LEGEND	EXISTING	PROPOSED
CONTOUR	632	634
SPOT ELEVATION		632.64
BOTTOM OF CURB ELEVATION		BC632.71
STORM PIPE		

40 0 10 25 40
SCALE 1 INCH = 40 FEET

NOT FOR CONSTRUCTION

Signature Date
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NO.	REVISIONS	BY	DATE

FIELD BOOK NO. (S)

CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
PARTIAL CONCEPTUAL GRADING & DRAINAGE PLAN

BENCH MARK:
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STAMPED "USC&GS BM Y-747, 1945" @ 41' S/O
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DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 04/02/2021

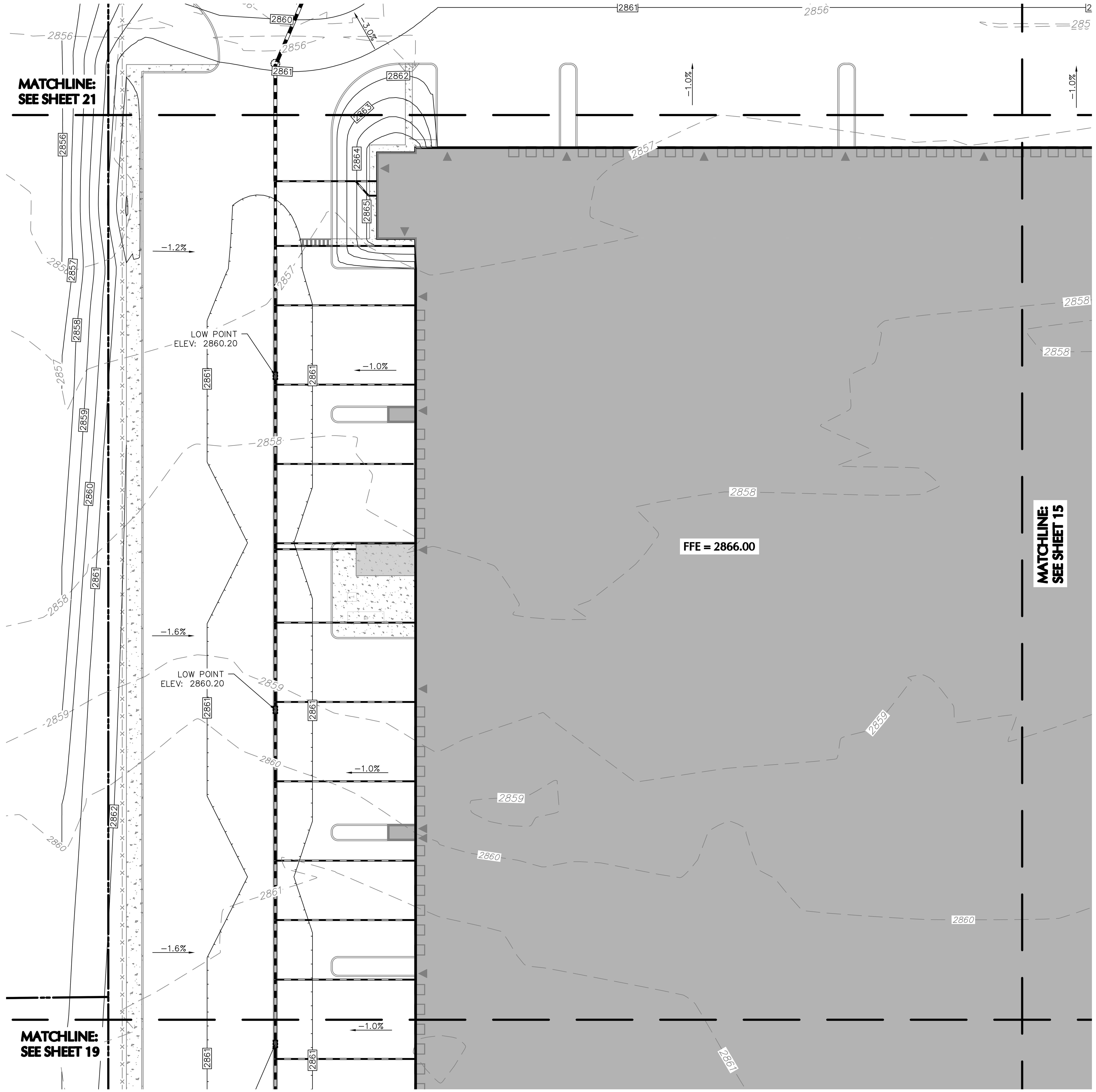
SHEET NO. 19 OF 36

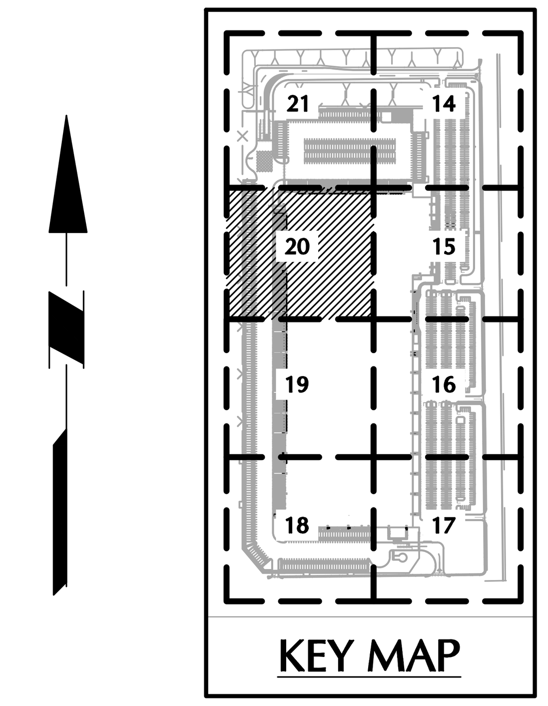
DRAWING NO. CG106

PROJECT NO. PSUB20-00022

APPROVED BY: CITY ENGINEER DATE: R.C.E. EXP.

Date: 4/1/2021 Time: 15:41 User: amlu Style Table: Langan.stb Layout: 19 Document Code: 700089101-0301-CG101-0101





LEGEND

	EXISTING	PROPOSED
CONTOUR	632	634
SPOT ELEVATION		632.64
BOTTOM OF CURB ELEVATION		BC632.72
STORM PIPE		

SCALE 1 INCH = 40 FEET

NOT FOR CONSTRUCTION

Signature Date

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FIELD BOOK NO. (S)

BENCH MARK:
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CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
PARTIAL CONCEPTUAL GRADING & DRAINAGE PLAN

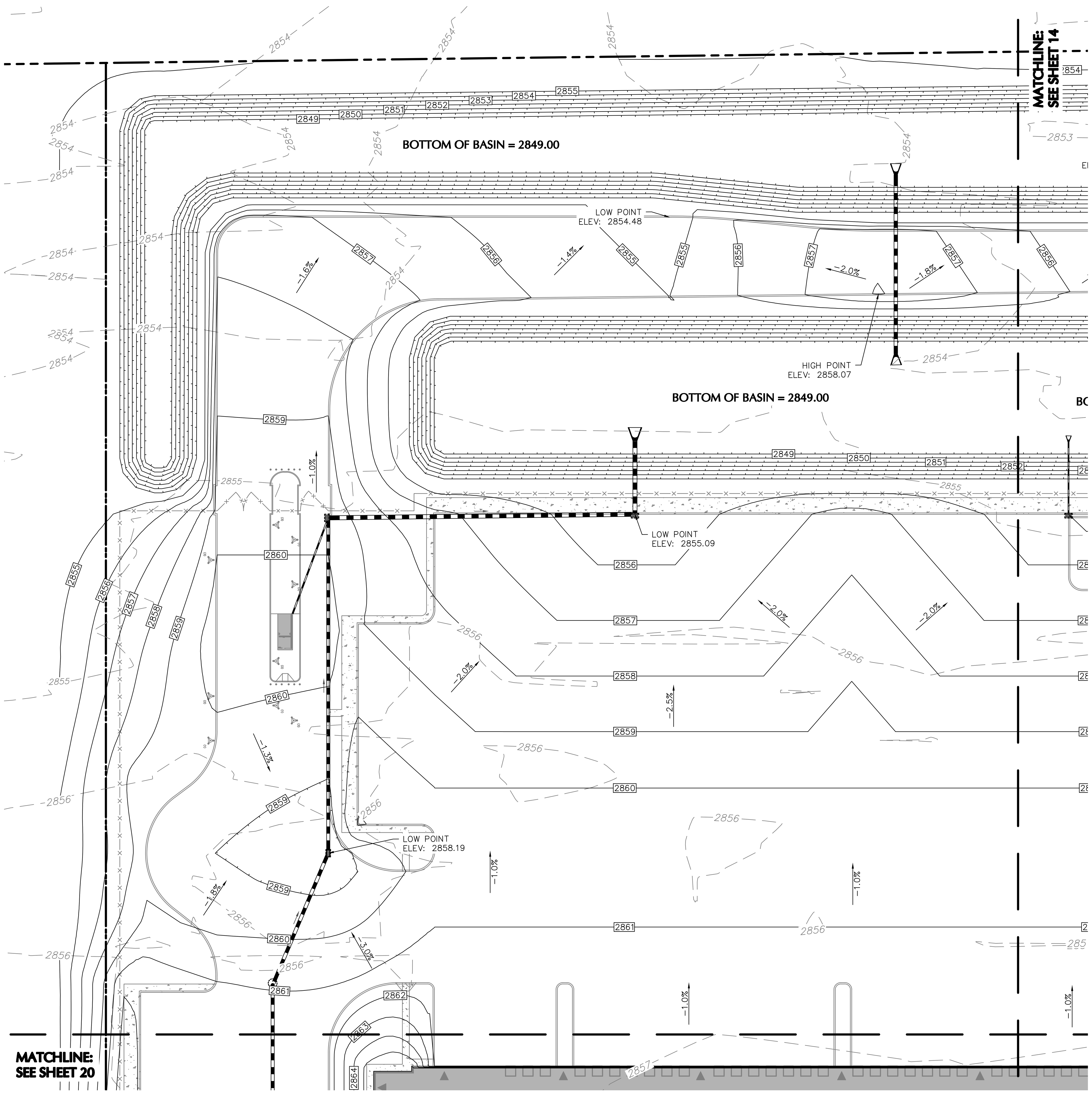
DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 04/02/2021

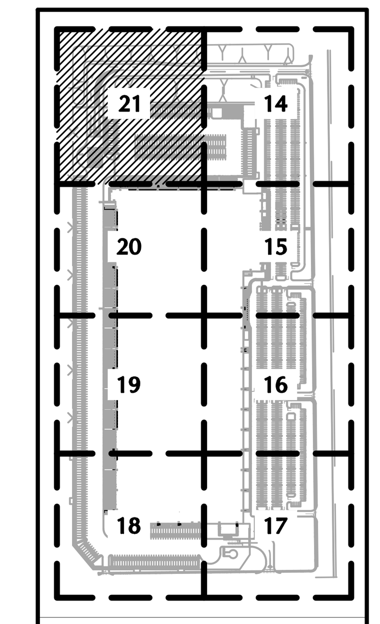
SHEET NO. 20 OF 36

DRAWING NO. CG107

PROJECT NO. PSUB20-00022

APPROVED BY: CITY ENGINEER DATE: R.C.E. EXP.





KEY MAP

LEGEND

	EXISTING	PROPOSED
CONTOUR	632	634
SPOT ELEVATION		632.64
BOTTOM OF CURB ELEVATION		BC632.71
STORM PIPE		

40 0 10 25 40
SCALE 1 INCH = 40 FEET

NOT FOR CONSTRUCTION

Signature Date

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NO.	REVISIONS	BY	DATE

FIELD BOOK NO. (S)

CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
PARTIAL CONCEPTUAL GRADING & DRAINAGE PLAN

BENCH MARK:
CITY OF VICTORVILLE BENCHMARK Y-747
ELEVATION = 2905.31' (NVGD 29)
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STAMPED "USC&GS BM Y-747, 1945" @ 41' S/O
AIREXPRESSWAY AND 93' W/O NEVADA AVE EXTENSION

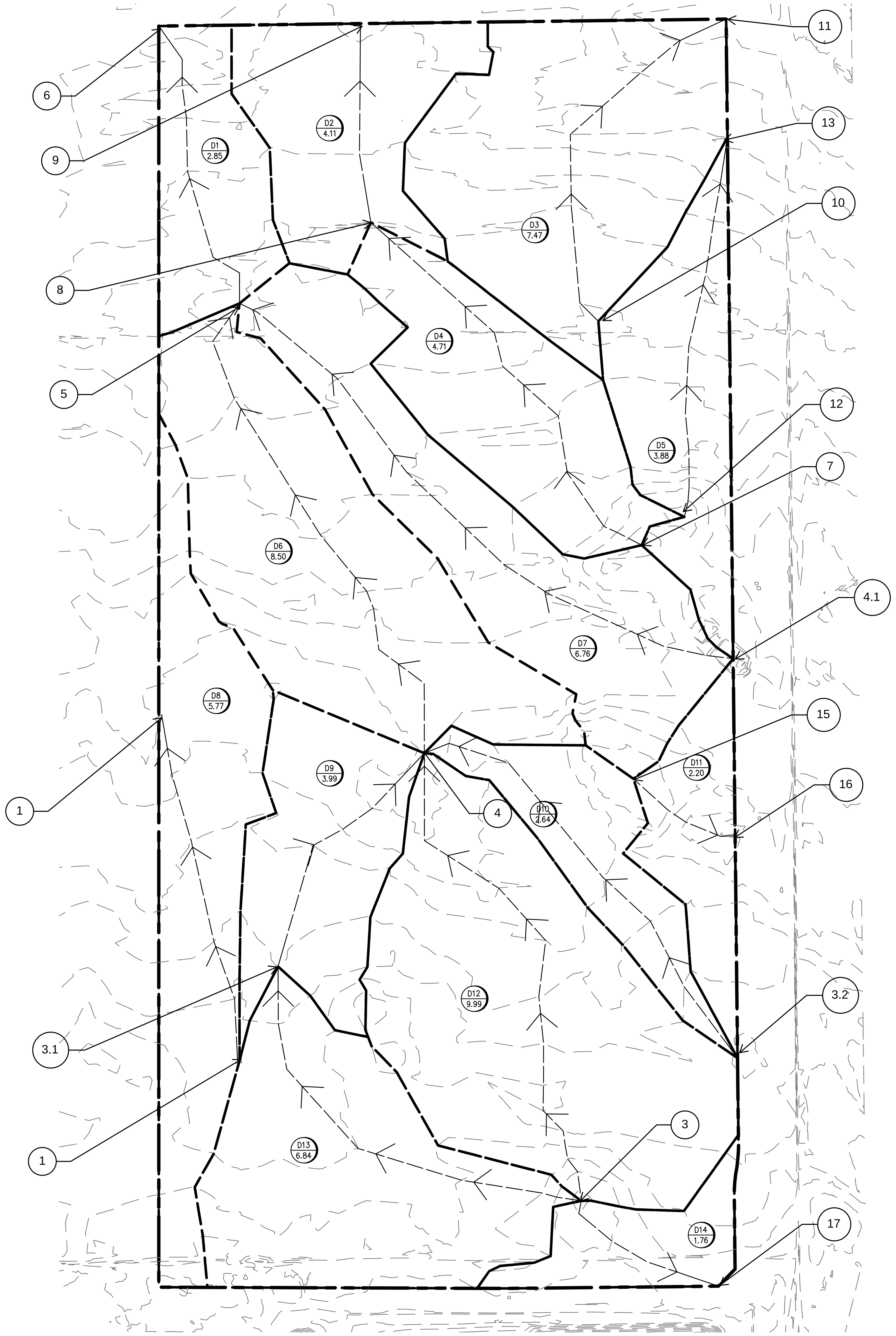
DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 04/02/2021

SHEET NO. 21 OF 36

DRAWING NO. CG108

PROJECT NO. PSUB20-00022

APPROVED BY: CITY ENGINEER ____ DATE: ____ R.C.E. EXP. ____



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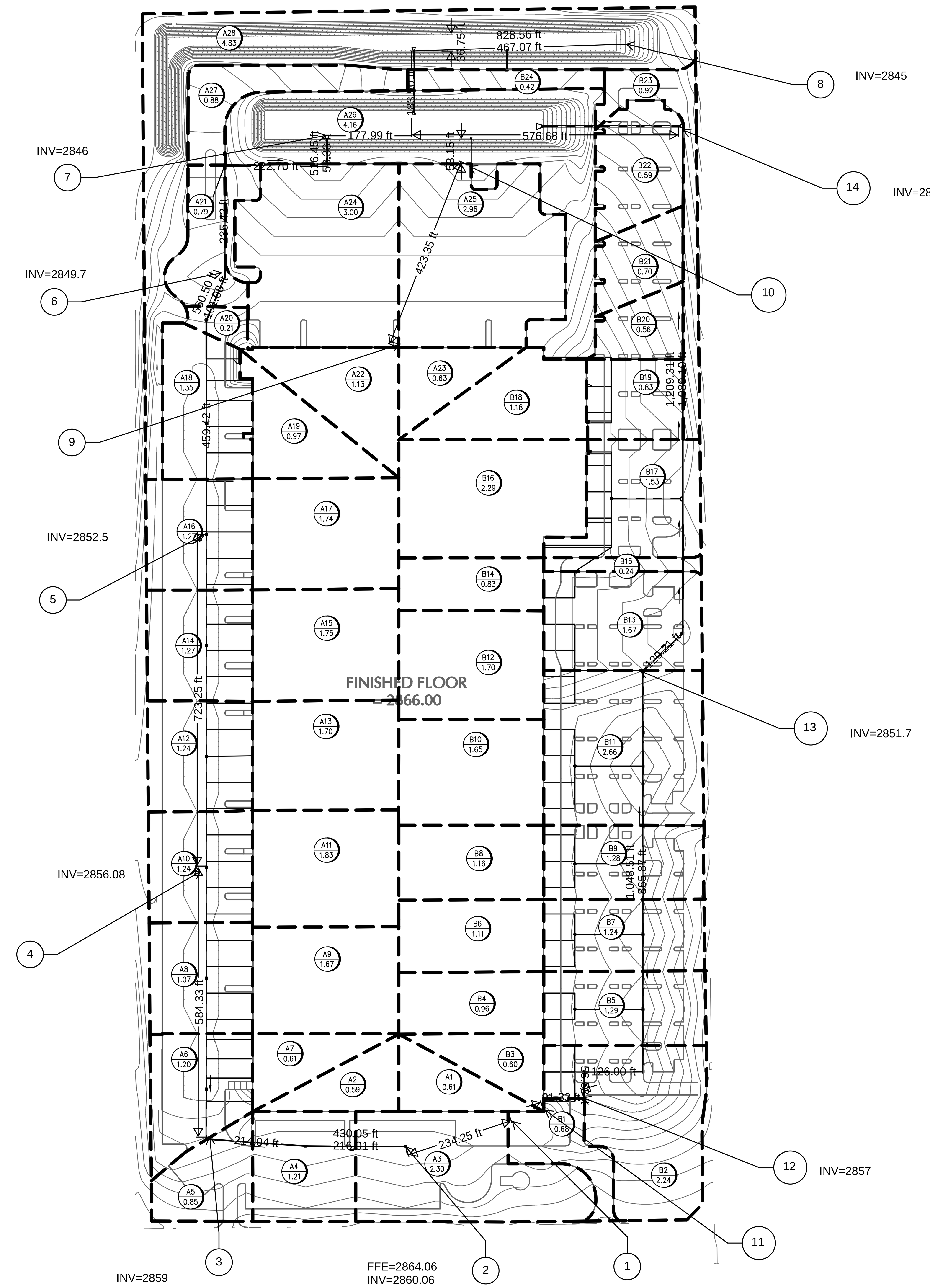

POST-DEVELOPMENT CONDITION

150 0 50 100 150

SCALE: 1 INCH = 150 FEET

NOT FOR CONSTRUCTION

Signature Date

MICHAEL GOLIAS
PROFESSIONAL ENGINEER CA LIC. No.: C91029

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14343 CIVIC DRIVE, VICTORVILLE, CA. 92392 (760) 955-5158

NO.	REVISIONS	BY	DATE

FIELD BOOK NO. (S)

BENCH MARK:
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CIVIL IMPROVEMENTS PLANS
PROJECT LOKI
DRAINAGE AREA PLAN

DESIGN BY: AL
DRAWN BY: JMA
CHECKED BY: MRG
DATE: 04/02/2021

SHEET NO. 31 OF 36

DRAWING NO. CA104

PROJECT NO. PSUB20-00022

APPROVED BY: CITY ENGINEER DATE: R.C.E. EXP.

APPENDIX B

NOAA Precipitation Frequency Chart

NOAA Atlas 14, Volume 6, Version 2
Location name: Victorville, California, USA*
Latitude: 34.5879°, Longitude: -117.373°
Elevation: 2872.39 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.086** (0.071-0.106)	**0.119** (0.098-0.146)	**0.165** (0.136-0.203)	**0.205** (0.167-0.254)	**0.261** (0.206-0.335)	**0.307** (0.237-0.402)	**0.356** (0.268-0.477)	**0.408** (0.299-0.562)	**0.482** (0.339-0.691)	**0.542** (0.368-0.804)
10-min	**0.124** (0.102-0.151)	**0.171** (0.141-0.210)	**0.237** (0.195-0.292)	**0.293** (0.239-0.364)	**0.374** (0.295-0.480)	**0.440** (0.340-0.576)	**0.510** (0.384-0.683)	**0.585** (0.429-0.805)	**0.691** (0.486-0.991)	**0.776** (0.528-1.15)
15-min	**0.149** (0.123-0.183)	**0.207** (0.170-0.254)	**0.287** (0.236-0.353)	**0.355** (0.289-0.440)	**0.453** (0.357-0.580)	**0.532** (0.411-0.696)	**0.617** (0.465-0.826)	**0.707** (0.519-0.974)	**0.835** (0.588-1.20)	**0.939** (0.639-1.39)
30-min	**0.200** (0.165-0.245)	**0.277** (0.228-0.340)	**0.384** (0.316-0.473)	**0.475** (0.387-0.589)	**0.607** (0.478-0.777)	**0.713** (0.551-0.933)	**0.826** (0.623-1.11)	**0.947** (0.695-1.31)	**1.12** (0.788-1.61)	**1.26** (0.856-1.87)
60-min	**0.236** (0.194-0.288)	**0.326** (0.269-0.400)	**0.452** (0.371-0.556)	**0.559** (0.456-0.693)	**0.714** (0.563-0.914)	**0.839** (0.648-1.10)	**0.972** (0.733-1.30)	**1.11** (0.817-1.53)	**1.32** (0.926-1.89)	**1.48** (1.01-2.20)
2-hr	**0.326** (0.269-0.399)	**0.438** (0.361-0.537)	**0.594** (0.488-0.730)	**0.727** (0.592-0.901)	**0.918** (0.724-1.18)	**1.07** (0.828-1.40)	**1.23** (0.930-1.65)	**1.41** (1.03-1.94)	**1.65** (1.16-2.37)	**1.84** (1.25-2.74)
3-hr	**0.383** (0.316-0.469)	**0.510** (0.420-0.625)	**0.686** (0.564-0.843)	**0.836** (0.681-1.04)	**1.05** (0.829-1.35)	**1.22** (0.946-1.60)	**1.41** (1.06-1.88)	**1.60** (1.17-2.20)	**1.87** (1.32-2.68)	**2.08** (1.42-3.09)
6-hr	**0.504** (0.415-0.617)	**0.667** (0.550-0.818)	**0.892** (0.732-1.10)	**1.08** (0.882-1.34)	**1.35** (1.07-1.73)	**1.57** (1.21-2.05)	**1.80** (1.35-2.41)	**2.04** (1.49-2.80)	**2.37** (1.67-3.40)	**2.63** (1.79-3.91)
12-hr	**0.622** (0.513-0.762)	**0.840** (0.692-1.03)	**1.14** (0.935-1.40)	**1.39** (1.13-1.72)	**1.73** (1.37-2.22)	**2.01** (1.55-2.63)	**2.30** (1.73-3.08)	**2.59** (1.90-3.57)	**3.01** (2.12-4.31)	**3.33** (2.26-4.94)
24-hr	**0.771** (0.684-0.887)	**1.07** (0.949-1.23)	**1.47** (1.30-1.70)	**1.81** (1.58-2.10)	**2.27** (1.92-2.73)	**2.63** (2.18-3.23)	**3.00** (2.43-3.78)	**3.38** (2.67-4.38)	**3.91** (2.96-5.28)	**4.32** (3.16-6.04)
2-day	**0.877** (0.777-1.01)	**1.24** (1.10-1.43)	**1.73** (1.52-1.99)	**2.13** (1.86-2.48)	**2.68** (2.27-3.22)	**3.11** (2.58-3.82)	**3.55** (2.87-4.47)	**4.00** (3.15-5.19)	**4.62** (3.50-6.24)	**5.10** (3.73-7.13)
3-day	**0.953** (0.845-1.10)	**1.35** (1.20-1.56)	**1.90** (1.68-2.20)	**2.35** (2.06-2.74)	**2.97** (2.51-3.57)	**3.44** (2.86-4.23)	**3.93** (3.18-4.95)	**4.44** (3.50-5.75)	**5.13** (3.88-6.93)	**5.67** (4.14-7.93)
4-day	**1.00** (0.891-1.16)	**1.43** (1.27-1.65)	**2.02** (1.79-2.34)	**2.50** (2.19-2.92)	**3.16** (2.68-3.80)	**3.67** (3.04-4.51)	**4.19** (3.39-5.27)	**4.72** (3.72-6.12)	**5.46** (4.13-7.37)	**6.02** (4.40-8.42)
7-day	**1.06** (0.935-1.21)	**1.51** (1.34-1.74)	**2.14** (1.89-2.47)	**2.65** (2.32-3.09)	**3.36** (2.85-4.04)	**3.90** (3.24-4.80)	**4.45** (3.60-5.60)	**5.00** (3.94-6.48)	**5.75** (4.35-7.77)	**6.31** (4.61-8.82)
10-day	**1.10** (0.974-1.26)	**1.58** (1.40-1.82)	**2.24** (1.98-2.59)	**2.79** (2.45-3.25)	**3.56** (3.01-4.28)	**4.14** (3.43-5.08)	**4.72** (3.83-5.95)	**5.32** (4.19-6.89)	**6.12** (4.63-8.27)	**6.72** (4.91-9.39)
20-day	**1.23** (1.09-1.42)	**1.81** (1.60-2.09)	**2.64** (2.33-3.04)	**3.33** (2.92-3.88)	**4.32** (3.66-5.20)	**5.09** (4.22-6.26)	**5.88** (4.76-7.41)	**6.69** (5.27-8.66)	**7.76** (5.86-10.5)	**8.56** (6.25-12.0)
30-day	**1.36** (1.21-1.57)	**2.03** (1.80-2.34)	**3.00** (2.65-3.47)	**3.84** (3.37-4.48)	**5.07** (4.29-6.10)	**6.03** (5.01-7.42)	**7.02** (5.69-8.85)	**8.04** (6.34-10.4)	**9.41** (7.11-12.7)	**10.4** (7.61-14.6)
45-day	**1.56** (1.39-1.80)	**2.36** (2.09-2.72)	**3.54** (3.13-4.09)	**4.59** (4.02-5.34)	**6.14** (5.21-7.40)	**7.42** (6.16-9.12)	**8.73** (7.07-11.0)	**10.1** (7.95-13.1)	**12.0** (9.04-16.1)	**13.4** (9.76-18.7)
60-day	**1.71** (1.52-1.97)	**2.59** (2.29-2.98)	**3.93** (3.47-4.54)	**5.14** (4.50-5.99)	**6.95** (5.89-8.37)	**8.46** (7.03-10.4)	**10.1** (8.16-12.7)	**11.7** (9.24-15.2)	**14.0** (10.6-19.0)	**15.8** (11.6-22.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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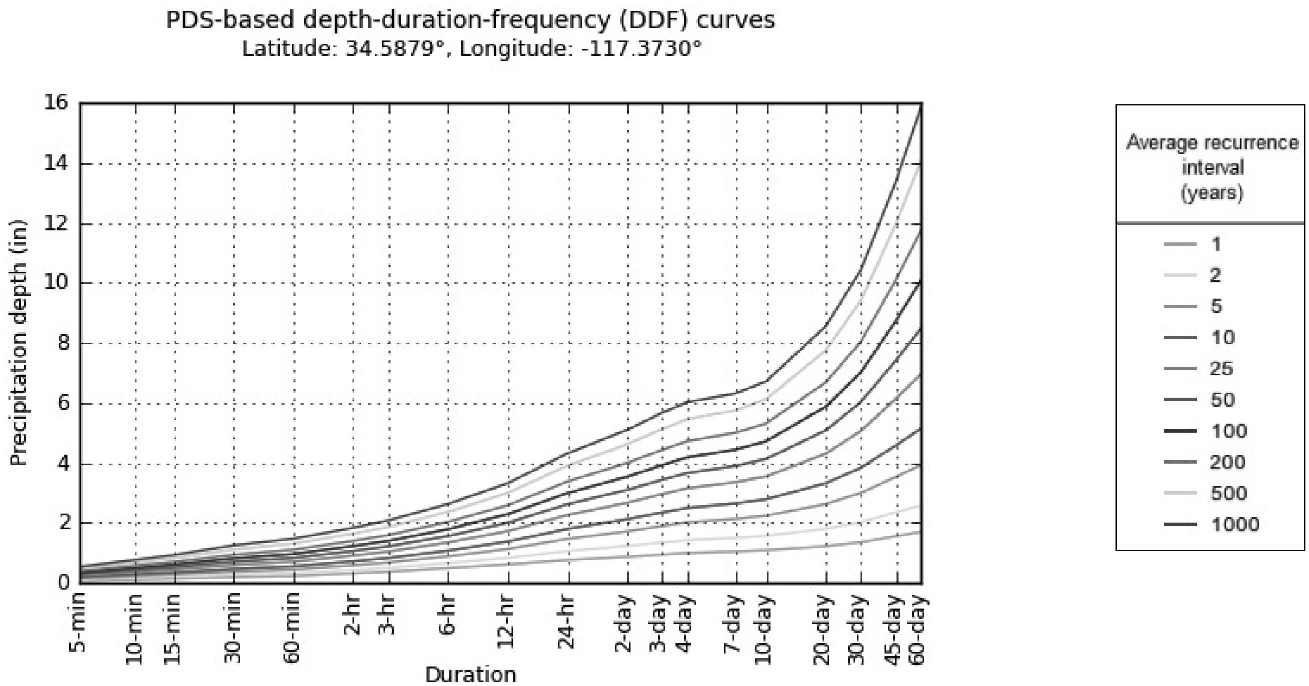
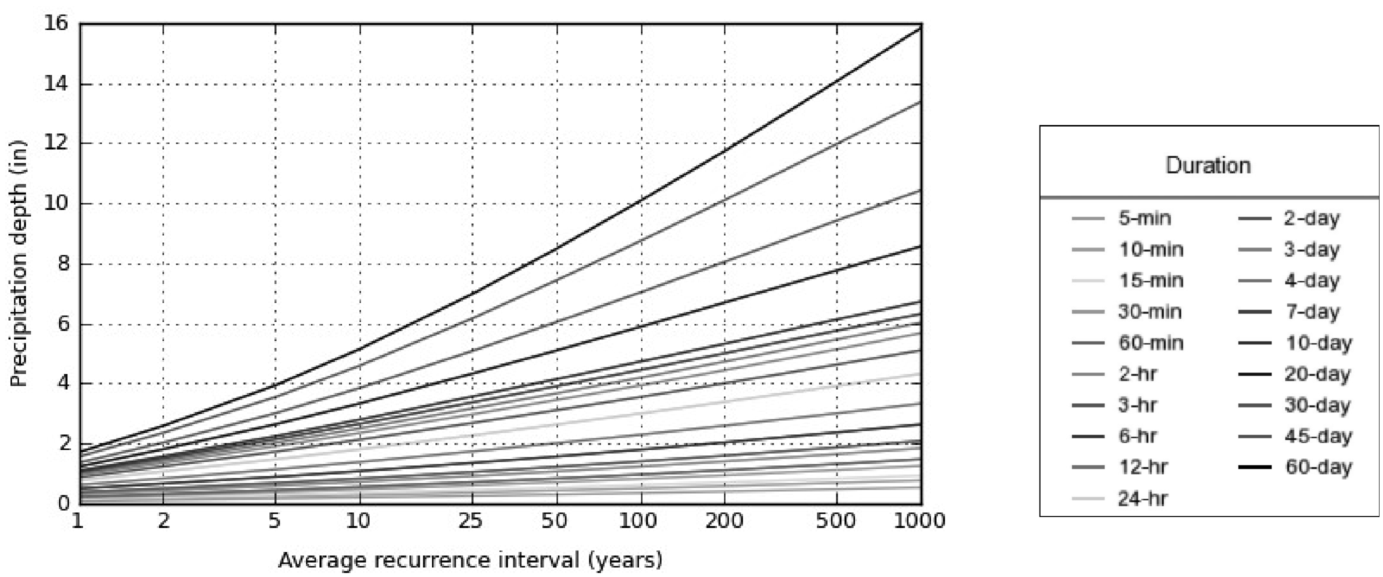
PF graphical





NOAA Atlas 14, Volume 6, Version 2 Created (GMT): Wed Dec 26 17:14:27 2018

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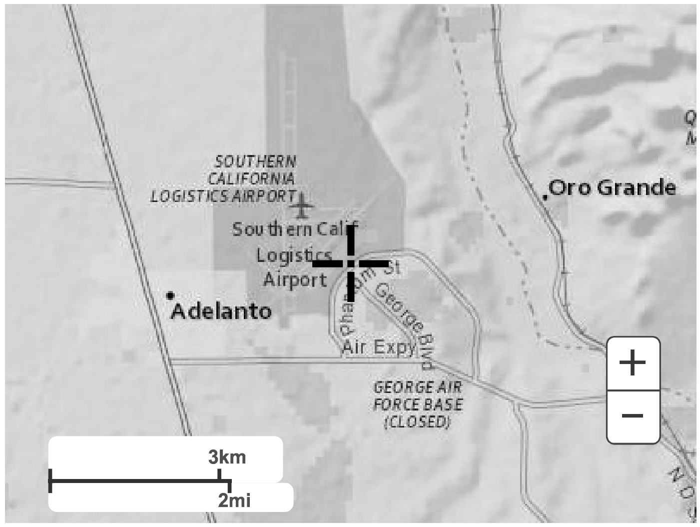
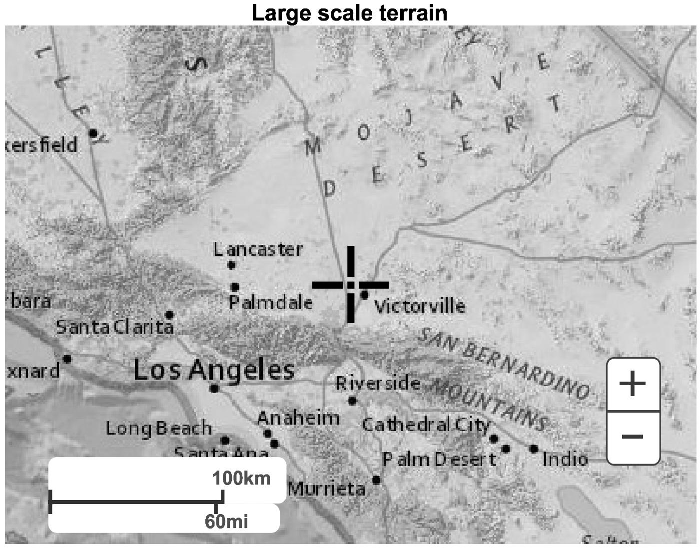
Maps & aerials

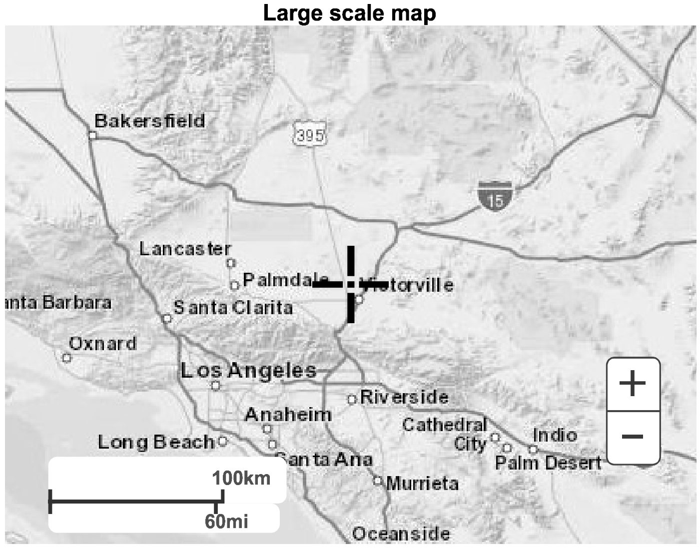
Small scale terrain



Large scale terrain



Large scale map



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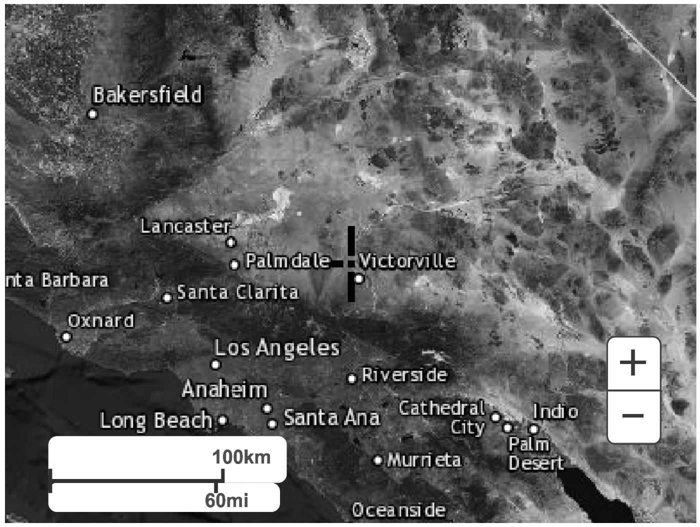

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX C

USDA Custom Soil Resource Report

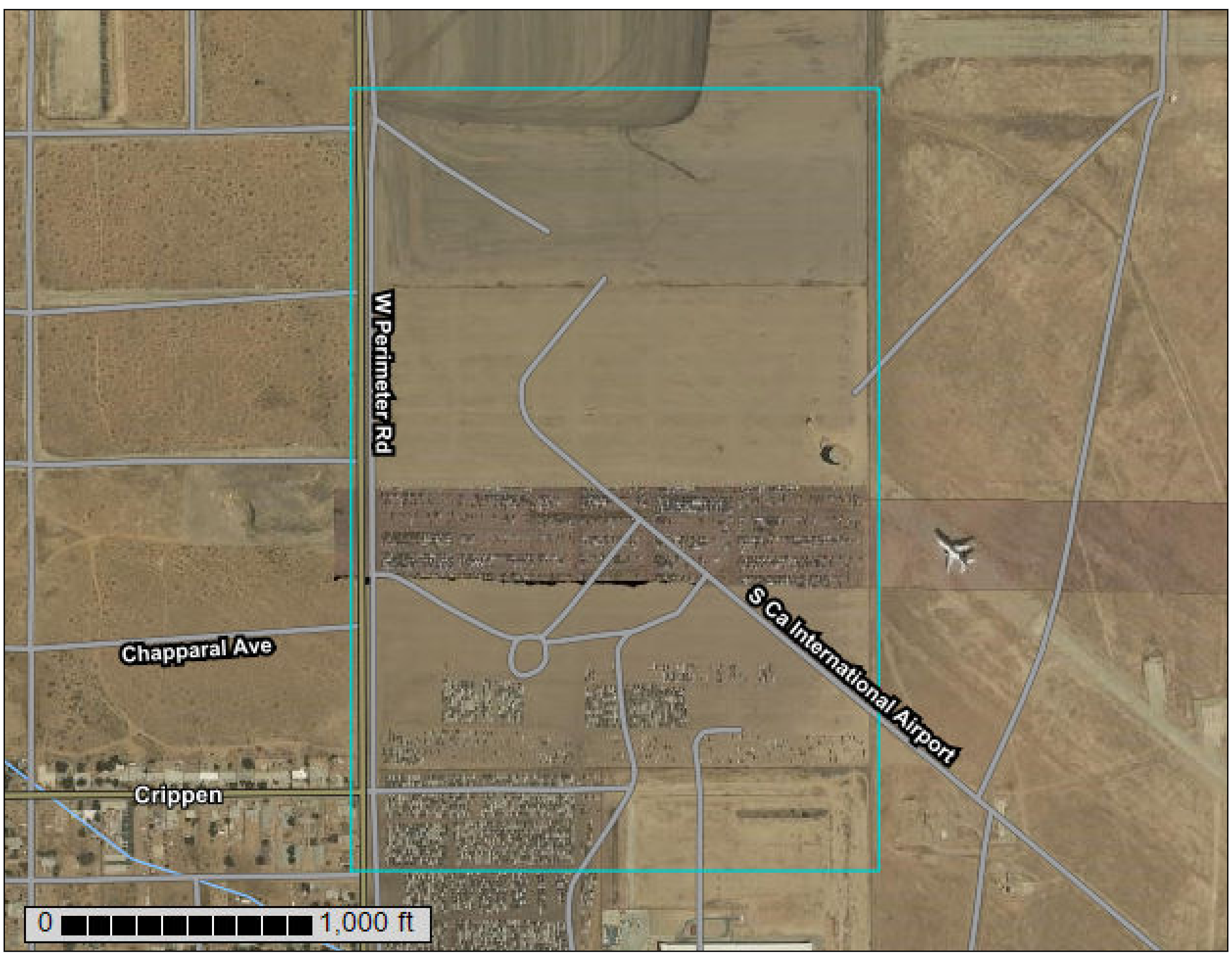
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Bernardino County, California, Mojave River Area



March 2, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:5,560 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 250, 500, 1000, 1500

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 12, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 19, 2018—Jul 8, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
105	BRYMAN LOAMY FINE SAND, 0 TO 2 PERCENT SLOPES	151.4	100.0%
Totals for Area of Interest		**151.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Bernardino County, California, Mojave River Area

105—BRYMAN LOAMY FINE SAND, 0 TO 2 PERCENT SLOPES

Map Unit Setting

National map unit symbol: hkr9
Elevation: 2,800 to 3,200 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 180 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Bryman and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bryman

Setting

Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 12 inches: sandy loam
H3 - 12 to 32 inches: sandy clay loam
H4 - 32 to 46 inches: sandy loam
H5 - 46 to 99 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R030XF012CA - Sandy
Hydric soil rating: No

Minor Components

Bryman, gravelly surface

Percent of map unit: 5 percent
Hydric soil rating: No

Helendale

Percent of map unit: 5 percent
Hydric soil rating: No

Cajon

Percent of map unit: 5 percent
Hydric soil rating: No

Mohave variant

Percent of map unit: 5 percent
Hydric soil rating: No

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APPENDIX D

Unit Hydrograph Analysis for 10-yr Storm Event

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/01/21

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San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6353

PROJECT LOKI
EXISTING CONDITION 10-YR STORM

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
71.40	1	0.56
Rainfall data for year 10		
71.40	6	1.08
Rainfall data for year 10		
71.40	24	1.81

++

```
******** Area-averaged max loss rate, Fm ********


SCS curve  SCS curve     Area     Area     Fp(Fig C6)    Ap      Fm
No.(AMCII) NO.(AMC 2)    (Ac.)    Fraction     (In/Hr)  (dec.)   (In/Hr)
 84.0      84.0         71.40      1.000     0.301    1.000    0.301

Area-averaged adjusted loss rate Fm (In/Hr) =  0.301

********* Area-Averaged low loss rate fraction, Yb **********

Area       Area          SCS CN    SCS CN      S     Pervious
 (Ac.)      Fract         (AMC2)    (AMC2)           Yield Fr
    71.40   1.000         84.0      84.0       1.90     0.338

Area-averaged catchment yield fraction, Y =  0.338
Area-averaged low loss fraction, Yb =  0.662
User entry of time of concentration  =   0.696 (hours)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Watershed area =      71.40(Ac.)
Catchment Lag time =   0.557 hours
Unit interval =   5.000 minutes
Unit interval percentage of lag time = 14.9665
Hydrograph baseflow =     0.00(CFS)
Average maximum watershed loss rate(Fm) =  0.301(In/Hr)
Average low loss rate fraction (Yb) = 0.662 (decimal)
MOUNTAIN S-Graph Selected
Computed peak 5-minute rainfall =  0.265(In)
Computed peak 30-minute rainfall =  0.454(In)
Specified peak 1-hour rainfall =  0.559(In)
Computed peak 3-hour rainfall =  0.837(In)
Specified peak 6-hour rainfall =  1.080(In)
Specified peak 24-hour rainfall =  1.810(In)


Rainfall depth area reduction factors:
Using a total area of      71.40(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997     Adjusted rainfall =  0.264(In)
30-minute factor = 0.997    Adjusted rainfall =  0.453(In)
1-hour factor = 0.997       Adjusted rainfall =  0.557(In)
3-hour factor = 1.000       Adjusted rainfall =  0.837(In)
6-hour factor = 1.000       Adjusted rainfall =  1.080(In)
24-hour factor = 1.000      Adjusted rainfall =  1.810(In)
---------------------------------------------------------------------

                        U n i t  H y d r o g r a p h
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Interval          'S' Graph          Unit Hydrograph
```

Number	Mean values	((CFS))
	(K = 863.49 (CFS))	
1	1.646	14.216
2	5.874	36.502
3	12.259	55.140
4	22.941	92.235
5	34.330	98.346
6	42.714	72.391
7	48.926	53.642
8	53.407	38.695
9	57.118	32.039
10	60.230	26.876
11	62.944	23.431
12	65.321	20.532
13	67.443	18.320
14	69.430	17.157
15	71.242	15.645
16	72.926	14.543
17	74.472	13.351
18	75.848	11.885
19	77.142	11.170
20	78.348	10.411
21	79.463	9.631
22	80.476	8.748
23	81.405	8.018
24	82.280	7.559
25	83.067	6.797
26	83.846	6.720
27	84.618	6.672
28	85.286	5.769
29	85.915	5.428
30	86.543	5.428
31	87.159	5.315
32	87.758	5.170
33	88.356	5.169
34	88.934	4.988
35	89.423	4.222
36	89.902	4.136
37	90.380	4.127
38	90.837	3.949
39	91.286	3.877
40	91.735	3.877
41	92.159	3.663
42	92.549	3.362
43	92.938	3.360
44	93.322	3.318
45	93.684	3.126
46	94.043	3.102

47	94.401	3.088
48	94.718	2.738
49	95.017	2.585
50	95.317	2.585
51	95.604	2.483
52	95.874	2.328
53	96.143	2.326
54	96.413	2.326
55	96.682	2.326
56	96.952	2.326
57	97.221	2.326
58	97.490	2.326
59	97.760	2.326
60	98.029	2.326
61	98.298	2.326
62	98.568	2.326
63	98.837	2.326
64	99.107	2.326
65	99.376	2.326
66	99.645	2.326
67	100.000	1.163

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.2644	0.2644
2	0.3255	0.0611
3	0.3676	0.0421
4	0.4007	0.0331
5	0.4284	0.0277
6	0.4525	0.0241
7	0.4739	0.0214
8	0.4933	0.0194
9	0.5111	0.0177
10	0.5275	0.0164
11	0.5428	0.0153
12	0.5571	0.0144
13	0.5739	0.0168
14	0.5898	0.0160
15	0.6051	0.0153
16	0.6197	0.0146
17	0.6338	0.0141
18	0.6474	0.0136
19	0.6605	0.0131
20	0.6731	0.0127
21	0.6854	0.0123
22	0.6973	0.0119
23	0.7089	0.0116
24	0.7201	0.0113
25	0.7311	0.0110
26	0.7418	0.0107

27	0.7522	0.0104
28	0.7624	0.0102
29	0.7724	0.0100
30	0.7821	0.0098
31	0.7917	0.0096
32	0.8010	0.0094
33	0.8102	0.0092
34	0.8192	0.0090
35	0.8281	0.0088
36	0.8367	0.0087
37	0.8452	0.0085
38	0.8536	0.0083
39	0.8618	0.0082
40	0.8698	0.0081
41	0.8778	0.0079
42	0.8856	0.0078
43	0.8933	0.0077
44	0.9009	0.0076
45	0.9083	0.0075
46	0.9157	0.0074
47	0.9230	0.0073
48	0.9301	0.0072
49	0.9372	0.0071
50	0.9442	0.0070
51	0.9511	0.0069
52	0.9579	0.0068
53	0.9647	0.0067
54	0.9713	0.0067
55	0.9779	0.0066
56	0.9844	0.0065
57	0.9908	0.0064
58	0.9972	0.0064
59	1.0035	0.0063
60	1.0097	0.0062
61	1.0159	0.0062
62	1.0220	0.0061
63	1.0280	0.0060
64	1.0340	0.0060
65	1.0399	0.0059
66	1.0457	0.0059
67	1.0515	0.0058
68	1.0573	0.0057
69	1.0630	0.0057
70	1.0686	0.0056
71	1.0742	0.0056
72	1.0798	0.0055
73	1.0853	0.0056
74	1.0908	0.0055
75	1.0963	0.0055
76	1.1017	0.0054

77	1.1071	0.0054
78	1.1124	0.0053
79	1.1177	0.0053
80	1.1230	0.0053
81	1.1282	0.0052
82	1.1334	0.0052
83	1.1385	0.0051
84	1.1436	0.0051
85	1.1486	0.0051
86	1.1537	0.0050
87	1.1586	0.0050
88	1.1636	0.0049
89	1.1685	0.0049
90	1.1734	0.0049
91	1.1782	0.0048
92	1.1830	0.0048
93	1.1878	0.0048
94	1.1925	0.0047
95	1.1972	0.0047
96	1.2019	0.0047
97	1.2066	0.0046
98	1.2112	0.0046
99	1.2158	0.0046
100	1.2203	0.0046
101	1.2249	0.0045
102	1.2294	0.0045
103	1.2339	0.0045
104	1.2383	0.0044
105	1.2427	0.0044
106	1.2471	0.0044
107	1.2515	0.0044
108	1.2558	0.0043
109	1.2602	0.0043
110	1.2645	0.0043
111	1.2687	0.0043
112	1.2730	0.0042
113	1.2772	0.0042
114	1.2814	0.0042
115	1.2856	0.0042
116	1.2897	0.0042
117	1.2939	0.0041
118	1.2980	0.0041
119	1.3021	0.0041
120	1.3061	0.0041
121	1.3102	0.0040
122	1.3142	0.0040
123	1.3182	0.0040
124	1.3222	0.0040
125	1.3261	0.0040
126	1.3301	0.0039

127	1.3340	0.0039
128	1.3379	0.0039
129	1.3418	0.0039
130	1.3457	0.0039
131	1.3495	0.0038
132	1.3533	0.0038
133	1.3571	0.0038
134	1.3609	0.0038
135	1.3647	0.0038
136	1.3685	0.0038
137	1.3722	0.0037
138	1.3759	0.0037
139	1.3796	0.0037
140	1.3833	0.0037
141	1.3870	0.0037
142	1.3907	0.0037
143	1.3943	0.0036
144	1.3979	0.0036
145	1.4015	0.0036
146	1.4051	0.0036
147	1.4087	0.0036
148	1.4123	0.0036
149	1.4158	0.0035
150	1.4193	0.0035
151	1.4229	0.0035
152	1.4264	0.0035
153	1.4299	0.0035
154	1.4333	0.0035
155	1.4368	0.0035
156	1.4402	0.0034
157	1.4437	0.0034
158	1.4471	0.0034
159	1.4505	0.0034
160	1.4539	0.0034
161	1.4573	0.0034
162	1.4606	0.0034
163	1.4640	0.0034
164	1.4673	0.0033
165	1.4707	0.0033
166	1.4740	0.0033
167	1.4773	0.0033
168	1.4806	0.0033
169	1.4838	0.0033
170	1.4871	0.0033
171	1.4904	0.0033
172	1.4936	0.0032
173	1.4968	0.0032
174	1.5000	0.0032
175	1.5033	0.0032
176	1.5064	0.0032

177	1.5096	0.0032
178	1.5128	0.0032
179	1.5160	0.0032
180	1.5191	0.0031
181	1.5223	0.0031
182	1.5254	0.0031
183	1.5285	0.0031
184	1.5316	0.0031
185	1.5347	0.0031
186	1.5378	0.0031
187	1.5409	0.0031
188	1.5439	0.0031
189	1.5470	0.0031
190	1.5500	0.0030
191	1.5531	0.0030
192	1.5561	0.0030
193	1.5591	0.0030
194	1.5621	0.0030
195	1.5651	0.0030
196	1.5681	0.0030
197	1.5711	0.0030
198	1.5740	0.0030
199	1.5770	0.0030
200	1.5799	0.0029
201	1.5829	0.0029
202	1.5858	0.0029
203	1.5887	0.0029
204	1.5916	0.0029
205	1.5945	0.0029
206	1.5974	0.0029
207	1.6003	0.0029
208	1.6032	0.0029
209	1.6061	0.0029
210	1.6089	0.0029
211	1.6118	0.0029
212	1.6146	0.0028
213	1.6174	0.0028
214	1.6203	0.0028
215	1.6231	0.0028
216	1.6259	0.0028
217	1.6287	0.0028
218	1.6315	0.0028
219	1.6343	0.0028
220	1.6370	0.0028
221	1.6398	0.0028
222	1.6426	0.0028
223	1.6453	0.0028
224	1.6481	0.0027
225	1.6508	0.0027
226	1.6535	0.0027

227	1.6563	0.0027
228	1.6590	0.0027
229	1.6617	0.0027
230	1.6644	0.0027
231	1.6671	0.0027
232	1.6698	0.0027
233	1.6724	0.0027
234	1.6751	0.0027
235	1.6778	0.0027
236	1.6804	0.0027
237	1.6831	0.0026
238	1.6857	0.0026
239	1.6884	0.0026
240	1.6910	0.0026
241	1.6936	0.0026
242	1.6962	0.0026
243	1.6988	0.0026
244	1.7014	0.0026
245	1.7040	0.0026
246	1.7066	0.0026
247	1.7092	0.0026
248	1.7118	0.0026
249	1.7143	0.0026
250	1.7169	0.0026
251	1.7195	0.0026
252	1.7220	0.0025
253	1.7245	0.0025
254	1.7271	0.0025
255	1.7296	0.0025
256	1.7321	0.0025
257	1.7347	0.0025
258	1.7372	0.0025
259	1.7397	0.0025
260	1.7422	0.0025
261	1.7447	0.0025
262	1.7472	0.0025
263	1.7496	0.0025
264	1.7521	0.0025
265	1.7546	0.0025
266	1.7570	0.0025
267	1.7595	0.0025
268	1.7620	0.0025
269	1.7644	0.0024
270	1.7668	0.0024
271	1.7693	0.0024
272	1.7717	0.0024
273	1.7741	0.0024
274	1.7765	0.0024
275	1.7790	0.0024
276	1.7814	0.0024

277	1.7838	0.0024
278	1.7862	0.0024
279	1.7886	0.0024
280	1.7909	0.0024
281	1.7933	0.0024
282	1.7957	0.0024
283	1.7981	0.0024
284	1.8004	0.0024
285	1.8028	0.0024
286	1.8051	0.0024
287	1.8075	0.0023
288	1.8098	0.0023

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0023	0.0016	0.0008
2	0.0023	0.0016	0.0008
3	0.0024	0.0016	0.0008
4	0.0024	0.0016	0.0008
5	0.0024	0.0016	0.0008
6	0.0024	0.0016	0.0008
7	0.0024	0.0016	0.0008
8	0.0024	0.0016	0.0008
9	0.0024	0.0016	0.0008
10	0.0024	0.0016	0.0008
11	0.0024	0.0016	0.0008
12	0.0024	0.0016	0.0008
13	0.0024	0.0016	0.0008
14	0.0024	0.0016	0.0008
15	0.0025	0.0016	0.0008
16	0.0025	0.0016	0.0008
17	0.0025	0.0016	0.0008
18	0.0025	0.0016	0.0008
19	0.0025	0.0016	0.0008
20	0.0025	0.0017	0.0008
21	0.0025	0.0017	0.0009
22	0.0025	0.0017	0.0009
23	0.0025	0.0017	0.0009
24	0.0025	0.0017	0.0009
25	0.0025	0.0017	0.0009
26	0.0026	0.0017	0.0009
27	0.0026	0.0017	0.0009
28	0.0026	0.0017	0.0009
29	0.0026	0.0017	0.0009
30	0.0026	0.0017	0.0009
31	0.0026	0.0017	0.0009
32	0.0026	0.0017	0.0009
33	0.0026	0.0017	0.0009

34	0.0026	0.0017	0.0009
35	0.0026	0.0018	0.0009
36	0.0027	0.0018	0.0009
37	0.0027	0.0018	0.0009
38	0.0027	0.0018	0.0009
39	0.0027	0.0018	0.0009
40	0.0027	0.0018	0.0009
41	0.0027	0.0018	0.0009
42	0.0027	0.0018	0.0009
43	0.0027	0.0018	0.0009
44	0.0027	0.0018	0.0009
45	0.0028	0.0018	0.0009
46	0.0028	0.0018	0.0009
47	0.0028	0.0018	0.0009
48	0.0028	0.0018	0.0009
49	0.0028	0.0019	0.0010
50	0.0028	0.0019	0.0010
51	0.0028	0.0019	0.0010
52	0.0028	0.0019	0.0010
53	0.0029	0.0019	0.0010
54	0.0029	0.0019	0.0010
55	0.0029	0.0019	0.0010
56	0.0029	0.0019	0.0010
57	0.0029	0.0019	0.0010
58	0.0029	0.0019	0.0010
59	0.0029	0.0019	0.0010
60	0.0029	0.0020	0.0010
61	0.0030	0.0020	0.0010
62	0.0030	0.0020	0.0010
63	0.0030	0.0020	0.0010
64	0.0030	0.0020	0.0010
65	0.0030	0.0020	0.0010
66	0.0030	0.0020	0.0010
67	0.0031	0.0020	0.0010
68	0.0031	0.0020	0.0010
69	0.0031	0.0020	0.0010
70	0.0031	0.0020	0.0010
71	0.0031	0.0021	0.0011
72	0.0031	0.0021	0.0011
73	0.0031	0.0021	0.0011
74	0.0032	0.0021	0.0011
75	0.0032	0.0021	0.0011
76	0.0032	0.0021	0.0011
77	0.0032	0.0021	0.0011
78	0.0032	0.0021	0.0011
79	0.0033	0.0022	0.0011
80	0.0033	0.0022	0.0011
81	0.0033	0.0022	0.0011
82	0.0033	0.0022	0.0011
83	0.0033	0.0022	0.0011

84	0.0033	0.0022	0.0011
85	0.0034	0.0022	0.0011
86	0.0034	0.0022	0.0011
87	0.0034	0.0023	0.0012
88	0.0034	0.0023	0.0012
89	0.0034	0.0023	0.0012
90	0.0035	0.0023	0.0012
91	0.0035	0.0023	0.0012
92	0.0035	0.0023	0.0012
93	0.0035	0.0023	0.0012
94	0.0035	0.0023	0.0012
95	0.0036	0.0024	0.0012
96	0.0036	0.0024	0.0012
97	0.0036	0.0024	0.0012
98	0.0036	0.0024	0.0012
99	0.0037	0.0024	0.0012
100	0.0037	0.0024	0.0012
101	0.0037	0.0025	0.0013
102	0.0037	0.0025	0.0013
103	0.0038	0.0025	0.0013
104	0.0038	0.0025	0.0013
105	0.0038	0.0025	0.0013
106	0.0038	0.0025	0.0013
107	0.0039	0.0026	0.0013
108	0.0039	0.0026	0.0013
109	0.0039	0.0026	0.0013
110	0.0040	0.0026	0.0013
111	0.0040	0.0026	0.0014
112	0.0040	0.0027	0.0014
113	0.0041	0.0027	0.0014
114	0.0041	0.0027	0.0014
115	0.0041	0.0027	0.0014
116	0.0042	0.0027	0.0014
117	0.0042	0.0028	0.0014
118	0.0042	0.0028	0.0014
119	0.0043	0.0028	0.0014
120	0.0043	0.0028	0.0015
121	0.0043	0.0029	0.0015
122	0.0044	0.0029	0.0015
123	0.0044	0.0029	0.0015
124	0.0044	0.0029	0.0015
125	0.0045	0.0030	0.0015
126	0.0045	0.0030	0.0015
127	0.0046	0.0030	0.0016
128	0.0046	0.0031	0.0016
129	0.0047	0.0031	0.0016
130	0.0047	0.0031	0.0016
131	0.0048	0.0032	0.0016
132	0.0048	0.0032	0.0016
133	0.0049	0.0032	0.0016

134	0.0049	0.0032	0.0017
135	0.0050	0.0033	0.0017
136	0.0050	0.0033	0.0017
137	0.0051	0.0034	0.0017
138	0.0051	0.0034	0.0017
139	0.0052	0.0034	0.0018
140	0.0053	0.0035	0.0018
141	0.0053	0.0035	0.0018
142	0.0054	0.0036	0.0018
143	0.0055	0.0036	0.0019
144	0.0055	0.0036	0.0019
145	0.0055	0.0037	0.0019
146	0.0056	0.0037	0.0019
147	0.0057	0.0038	0.0019
148	0.0057	0.0038	0.0019
149	0.0059	0.0039	0.0020
150	0.0059	0.0039	0.0020
151	0.0060	0.0040	0.0020
152	0.0061	0.0040	0.0021
153	0.0062	0.0041	0.0021
154	0.0063	0.0042	0.0021
155	0.0064	0.0043	0.0022
156	0.0065	0.0043	0.0022
157	0.0067	0.0044	0.0023
158	0.0067	0.0045	0.0023
159	0.0069	0.0046	0.0023
160	0.0070	0.0046	0.0024
161	0.0072	0.0047	0.0024
162	0.0073	0.0048	0.0025
163	0.0075	0.0049	0.0025
164	0.0076	0.0050	0.0026
165	0.0078	0.0052	0.0026
166	0.0079	0.0053	0.0027
167	0.0082	0.0054	0.0028
168	0.0083	0.0055	0.0028
169	0.0087	0.0057	0.0029
170	0.0088	0.0058	0.0030
171	0.0092	0.0061	0.0031
172	0.0094	0.0062	0.0032
173	0.0098	0.0065	0.0033
174	0.0100	0.0066	0.0034
175	0.0104	0.0069	0.0035
176	0.0107	0.0071	0.0036
177	0.0113	0.0074	0.0038
178	0.0116	0.0077	0.0039
179	0.0123	0.0081	0.0042
180	0.0127	0.0084	0.0043
181	0.0136	0.0090	0.0046
182	0.0141	0.0093	0.0048
183	0.0153	0.0101	0.0052

184	0.0160	0.0106	0.0054
185	0.0144	0.0095	0.0049
186	0.0153	0.0101	0.0052
187	0.0177	0.0117	0.0060
188	0.0194	0.0128	0.0066
189	0.0241	0.0159	0.0082
190	0.0277	0.0184	0.0094
191	0.0421	0.0250	0.0170
192	0.0611	0.0250	0.0361
193	0.2644	0.0250	0.2393
194	0.0331	0.0219	0.0112
195	0.0214	0.0142	0.0072
196	0.0164	0.0109	0.0056
197	0.0168	0.0111	0.0057
198	0.0146	0.0097	0.0050
199	0.0131	0.0087	0.0044
200	0.0119	0.0079	0.0040
201	0.0110	0.0073	0.0037
202	0.0102	0.0067	0.0035
203	0.0096	0.0063	0.0032
204	0.0090	0.0060	0.0030
205	0.0085	0.0056	0.0029
206	0.0081	0.0053	0.0027
207	0.0077	0.0051	0.0026
208	0.0074	0.0049	0.0025
209	0.0071	0.0047	0.0024
210	0.0068	0.0045	0.0023
211	0.0066	0.0044	0.0022
212	0.0064	0.0042	0.0022
213	0.0062	0.0041	0.0021
214	0.0060	0.0040	0.0020
215	0.0058	0.0038	0.0020
216	0.0056	0.0037	0.0019
217	0.0056	0.0037	0.0019
218	0.0054	0.0036	0.0018
219	0.0053	0.0035	0.0018
220	0.0052	0.0034	0.0017
221	0.0051	0.0033	0.0017
222	0.0049	0.0033	0.0017
223	0.0048	0.0032	0.0016
224	0.0047	0.0031	0.0016
225	0.0046	0.0031	0.0016
226	0.0046	0.0030	0.0015
227	0.0045	0.0030	0.0015
228	0.0044	0.0029	0.0015
229	0.0043	0.0029	0.0015
230	0.0042	0.0028	0.0014
231	0.0042	0.0028	0.0014
232	0.0041	0.0027	0.0014
233	0.0040	0.0027	0.0014

234	0.0040	0.0026	0.0013
235	0.0039	0.0026	0.0013
236	0.0039	0.0026	0.0013
237	0.0038	0.0025	0.0013
238	0.0038	0.0025	0.0013
239	0.0037	0.0025	0.0013
240	0.0037	0.0024	0.0012
241	0.0036	0.0024	0.0012
242	0.0036	0.0024	0.0012
243	0.0035	0.0023	0.0012
244	0.0035	0.0023	0.0012
245	0.0034	0.0023	0.0012
246	0.0034	0.0022	0.0011
247	0.0034	0.0022	0.0011
248	0.0033	0.0022	0.0011
249	0.0033	0.0022	0.0011
250	0.0032	0.0021	0.0011
251	0.0032	0.0021	0.0011
252	0.0032	0.0021	0.0011
253	0.0031	0.0021	0.0011
254	0.0031	0.0021	0.0011
255	0.0031	0.0020	0.0010
256	0.0030	0.0020	0.0010
257	0.0030	0.0020	0.0010
258	0.0030	0.0020	0.0010
259	0.0030	0.0020	0.0010
260	0.0029	0.0019	0.0010
261	0.0029	0.0019	0.0010
262	0.0029	0.0019	0.0010
263	0.0029	0.0019	0.0010
264	0.0028	0.0019	0.0010
265	0.0028	0.0019	0.0009
266	0.0028	0.0018	0.0009
267	0.0028	0.0018	0.0009
268	0.0027	0.0018	0.0009
269	0.0027	0.0018	0.0009
270	0.0027	0.0018	0.0009
271	0.0027	0.0018	0.0009
272	0.0026	0.0017	0.0009
273	0.0026	0.0017	0.0009
274	0.0026	0.0017	0.0009
275	0.0026	0.0017	0.0009
276	0.0026	0.0017	0.0009
277	0.0025	0.0017	0.0009
278	0.0025	0.0017	0.0009
279	0.0025	0.0017	0.0008
280	0.0025	0.0016	0.0008
281	0.0025	0.0016	0.0008
282	0.0025	0.0016	0.0008
283	0.0024	0.0016	0.0008

284	0.0024	0.0016	0.0008
285	0.0024	0.0016	0.0008
286	0.0024	0.0016	0.0008
287	0.0024	0.0016	0.0008
288	0.0024	0.0016	0.0008

Total soil rain loss = 1.03(In)
Total effective rainfall = 0.78(In)
Peak flow rate in flood hydrograph = 30.84(CFS)

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0004	0.04	Q	|	|	|	|
0+15	0.0009	0.08	Q	|	|	|	|
0+20	0.0020	0.16	Q	|	|	|	|
0+25	0.0036	0.24	Q	|	|	|	|
0+30	0.0057	0.29	Q	|	|	|	|
0+35	0.0080	0.34	Q	|	|	|	|
0+40	0.0105	0.37	Q	|	|	|	|
0+45	0.0133	0.40	Q	|	|	|	|
0+50	0.0162	0.42	Q	|	|	|	|
0+55	0.0192	0.44	Q	|	|	|	|
1+ 0	0.0223	0.46	Q	|	|	|	|
1+ 5	0.0256	0.47	Q	|	|	|	|
1+10	0.0289	0.49	Q	|	|	|	|
1+15	0.0324	0.50	Q	|	|	|	|
1+20	0.0359	0.52	Q	|	|	|	|
1+25	0.0396	0.53	Q	|	|	|	|
1+30	0.0433	0.54	Q	|	|	|	|
1+35	0.0471	0.55	Q	|	|	|	|
1+40	0.0509	0.56	Q	|	|	|	|
1+45	0.0548	0.57	Q	|	|	|	|
1+50	0.0588	0.58	Q	|	|	|	|
1+55	0.0629	0.59	Q	|	|	|	|
2+ 0	0.0670	0.59	Q	|	|	|	|
2+ 5	0.0711	0.60	Q	|	|	|	|
2+10	0.0753	0.61	Q	|	|	|	|
2+15	0.0796	0.62	Q	|	|	|	|
2+20	0.0838	0.62	Q	|	|	|	|
2+25	0.0882	0.63	Q	|	|	|	|
2+30	0.0926	0.64	Q	|	|	|	|

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 2+35        0.0970      0.64  Q          |         |         |         |
 2+40        0.1015      0.65  Q          |         |         |         |
 2+45        0.1060      0.66  Q          |         |         |         |
 2+50        0.1106      0.66  Q          |         |         |         |
 2+55        0.1152      0.67  Q          |         |         |         |
 3+ 0        0.1198      0.67  QV         |         |         |         |
 3+ 5        0.1245      0.68  QV         |         |         |         |
 3+10        0.1293      0.69  QV         |         |         |         |
 3+15        0.1340      0.69  QV         |         |         |         |
 3+20        0.1388      0.70  QV         |         |         |         |
 3+25        0.1437      0.70  QV         |         |         |         |
 3+30        0.1486      0.71  QV         |         |         |         |
 3+35        0.1535      0.71  QV         |         |         |         |
 3+40        0.1584      0.72  QV         |         |         |         |
 3+45        0.1634      0.73  QV         |         |         |         |
 3+50        0.1685      0.73  QV         |         |         |         |
 3+55        0.1735      0.74  QV         |         |         |         |
 4+ 0        0.1786      0.74  QV         |         |         |         |
 4+ 5        0.1838      0.75  QV         |         |         |         |
 4+10        0.1890      0.75  QV         |         |         |         |
 4+15        0.1942      0.76  QV         |         |         |         |
 4+20        0.1994      0.76  QV         |         |         |         |
 4+25        0.2047      0.77  QV         |         |         |         |
 4+30        0.2100      0.77  QV         |         |         |         |
 4+35        0.2153      0.78  QV         |         |         |         |
 4+40        0.2207      0.78  QV         |         |         |         |
 4+45        0.2262      0.79  QV         |         |         |         |
 4+50        0.2316      0.79  Q V        |         |         |         |
 4+55        0.2371      0.80  Q V        |         |         |         |
 5+ 0        0.2426      0.80  Q V        |         |         |         |
 5+ 5        0.2482      0.81  Q V        |         |         |         |
 5+10        0.2538      0.81  Q V        |         |         |         |
 5+15        0.2594      0.82  Q V        |         |         |         |
 5+20        0.2651      0.82  Q V        |         |         |         |
 5+25        0.2708      0.83  Q V        |         |         |         |
 5+30        0.2766      0.84  Q V        |         |         |         |
 5+35        0.2824      0.84  Q V        |         |         |         |
 5+40        0.2882      0.84  Q V        |         |         |         |
 5+45        0.2940      0.85  Q V        |         |         |         |
 5+50        0.2999      0.85  Q V        |         |         |         |
 5+55        0.3058      0.86  Q V        |         |         |         |
 6+ 0        0.3117      0.86  Q V        |         |         |         |
 6+ 5        0.3177      0.86  Q V        |         |         |         |
 6+10        0.3237      0.87  Q V        |         |         |         |
 6+15        0.3297      0.87  Q V        |         |         |         |
 6+20        0.3357      0.88  Q V        |         |         |         |
 6+25        0.3418      0.88  Q V        |         |         |         |
 6+30        0.3479      0.89  Q  V       |         |         |         |
 6+35        0.3540      0.89  Q  V       |         |         |         |
 6+40        0.3602      0.89  Q  V       |         |         |         |
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 6+45      0.3664      0.90  Q  V      |         |         |         |
 6+50      0.3726      0.90  Q  V      |         |         |         |
 6+55      0.3789      0.91  Q  V      |         |         |         |
 7+ 0      0.3852      0.91  Q  V      |         |         |         |
 7+ 5      0.3915      0.92  Q  V      |         |         |         |
 7+10      0.3979      0.92  Q  V      |         |         |         |
 7+15      0.4043      0.93  Q  V      |         |         |         |
 7+20      0.4107      0.93  Q  V      |         |         |         |
 7+25      0.4171      0.94  Q  V      |         |         |         |
 7+30      0.4236      0.94  Q  V      |         |         |         |
 7+35      0.4302      0.95  Q  V      |         |         |         |
 7+40      0.4367      0.95  Q  V      |         |         |         |
 7+45      0.4434      0.96  Q  V      |         |         |         |
 7+50      0.4500      0.97  Q  V      |         |         |         |
 7+55      0.4567      0.97  Q  V      |         |         |         |
 8+ 0      0.4634      0.98  Q   V     |         |         |         |
 8+ 5      0.4702      0.98  Q   V     |         |         |         |
 8+10      0.4770      0.99  Q   V     |         |         |         |
 8+15      0.4838      0.99  Q   V     |         |         |         |
 8+20      0.4907      1.00  Q   V     |         |         |         |
 8+25      0.4976      1.01  |Q  V     |         |         |         |
 8+30      0.5046      1.01  |Q  V     |         |         |         |
 8+35      0.5116      1.02  |Q  V     |         |         |         |
 8+40      0.5187      1.02  |Q  V     |         |         |         |
 8+45      0.5258      1.03  |Q  V     |         |         |         |
 8+50      0.5329      1.04  |Q  V     |         |         |         |
 8+55      0.5401      1.04  |Q  V     |         |         |         |
 9+ 0      0.5474      1.05  |Q  V     |         |         |         |
 9+ 5      0.5547      1.06  |Q  V     |         |         |         |
 9+10      0.5620      1.07  |Q  V     |         |         |         |
 9+15      0.5694      1.07  |Q  V     |         |         |         |
 9+20      0.5768      1.08  |Q  V     |         |         |         |
 9+25      0.5843      1.09  |Q   V    |         |         |         |
 9+30      0.5919      1.10  |Q   V    |         |         |         |
 9+35      0.5995      1.10  |Q   V    |         |         |         |
 9+40      0.6071      1.11  |Q   V    |         |         |         |
 9+45      0.6148      1.12  |Q   V    |         |         |         |
 9+50      0.6226      1.13  |Q   V    |         |         |         |
 9+55      0.6304      1.14  |Q   V    |         |         |         |
10+ 0      0.6383      1.14  |Q   V    |         |         |         |
10+ 5      0.6462      1.15  |Q   V    |         |         |         |
10+10      0.6542      1.16  |Q   V    |         |         |         |
10+15      0.6623      1.17  |Q   V    |         |         |         |
10+20      0.6704      1.18  |Q   V    |         |         |         |
10+25      0.6786      1.19  |Q   V    |         |         |         |
10+30      0.6869      1.20  |Q   V    |         |         |         |
10+35      0.6952      1.21  |Q    V   |         |         |         |
10+40      0.7036      1.22  |Q    V   |         |         |         |
10+45      0.7121      1.23  |Q    V   |         |         |         |
10+50      0.7206      1.24  |Q    V   |         |         |         |
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10+55       0.7293      1.25   |Q    V   |         |         |         |
11+ 0       0.7380      1.26   |Q    V   |         |         |         |
11+ 5       0.7467      1.27   |Q    V   |         |         |         |
11+10       0.7556      1.29   |Q    V   |         |         |         |
11+15       0.7645      1.30   |Q    V   |         |         |         |
11+20       0.7735      1.31   |Q    V   |         |         |         |
11+25       0.7827      1.32   |Q    V   |         |         |         |
11+30       0.7918      1.34   |Q    V   |         |         |         |
11+35       0.8011      1.35   |Q    V   |         |         |         |
11+40       0.8105      1.36   |Q    V   |         |         |         |
11+45       0.8200      1.38   |Q     V  |         |         |         |
11+50       0.8296      1.39   |Q     V  |         |         |         |
11+55       0.8392      1.40   |Q     V  |         |         |         |
12+ 0       0.8490      1.42   |Q     V  |         |         |         |
12+ 5       0.8589      1.43   |Q     V  |         |         |         |
12+10       0.8689      1.45   |Q     V  |         |         |         |
12+15       0.8790      1.47   |Q     V  |         |         |         |
12+20       0.8892      1.48   |Q     V  |         |         |         |
12+25       0.8995      1.49   |Q     V  |         |         |         |
12+30       0.9099      1.51   |Q     V  |         |         |         |
12+35       0.9204      1.53   |Q     V  |         |         |         |
12+40       0.9310      1.55   |Q      V |         |         |         |
12+45       0.9418      1.57   |Q      V |         |         |         |
12+50       0.9528      1.59   |Q      V |         |         |         |
12+55       0.9638      1.61   |Q      V |         |         |         |
13+ 0       0.9750      1.63   |Q      V |         |         |         |
13+ 5       0.9864      1.65   |Q      V |         |         |         |
13+10       0.9979      1.67   |Q      V |         |         |         |
13+15       1.0096      1.70   |Q      V |         |         |         |
13+20       1.0215      1.72   |Q      V |         |         |         |
13+25       1.0336      1.75   |Q      V |         |         |         |
13+30       1.0458      1.78   |Q       V|         |         |         |
13+35       1.0583      1.81   |Q       V|         |         |         |
13+40       1.0709      1.84   |Q       V|         |         |         |
13+45       1.0838      1.87   |Q       V|         |         |         |
13+50       1.0969      1.90   |Q       V|         |         |         |
13+55       1.1102      1.94   |Q       V|         |         |         |
14+ 0       1.1238      1.97   |Q       V|         |         |         |
14+ 5       1.1377      2.01   | Q      V|         |         |         |
14+10       1.1519      2.06   | Q      V|         |         |         |
14+15       1.1663      2.10   | Q       V         |         |         |
14+20       1.1811      2.15   | Q       V         |         |         |
14+25       1.1963      2.20   | Q       V         |         |         |
14+30       1.2118      2.25   | Q       V         |         |         |
14+35       1.2277      2.31   | Q       V         |         |         |
14+40       1.2440      2.37   | Q       V         |         |         |
14+45       1.2608      2.44   | Q       V         |         |         |
14+50       1.2780      2.51   | Q       |V        |         |         |
14+55       1.2958      2.58   | Q       |V        |         |         |
15+ 0       1.3142      2.66   | Q       |V        |         |         |
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15+ 5       1.3331      2.76  | Q       |V        |         |         |
15+10       1.3528      2.86  | Q       |V        |         |         |
15+15       1.3732      2.97  | Q       |V        |         |         |
15+20       1.3945      3.09  |  Q      | V       |         |         |
15+25       1.4167      3.21  |  Q      | V       |         |         |
15+30       1.4396      3.33  |  Q      | V       |         |         |
15+35       1.4634      3.46  |  Q      | V       |         |         |
15+40       1.4880      3.57  |  Q      | V       |         |         |
15+45       1.5137      3.72  |  Q      |  V      |         |         |
15+50       1.5410      3.97  |  Q      |  V      |         |         |
15+55       1.5713      4.40  |   Q     |  V      |         |         |
16+ 0       1.6080      5.33  |    Q    |  V      |         |         |
16+ 5       1.6750      9.73  |        Q|   V     |         |         |
16+10       1.7852     16.00  |         |    Q    |         |         |
16+15       1.9339     21.59  |         |     V   | Q       |         |
16+20       2.1420     30.22  |         |       V |         Q         |
16+25       2.3543     30.84  |         |         V         Q         |
16+30       2.5204     24.11  |         |         |V  Q     |         |
16+35       2.6515     19.03  |         |        Q| V       |         |
16+40       2.7553     15.08  |         |    Q    |  V      |         |
16+45       2.8457     13.12  |         |  Q      |   V     |         |
16+50       2.9254     11.58  |         |Q        |    V    |         |
16+55       2.9975     10.47  |         Q         |    V    |         |
17+ 0       3.0631      9.53  |        Q|         |     V   |         |
17+ 5       3.1236      8.79  |       Q |         |     V   |         |
17+10       3.1808      8.30  |       Q |         |      V  |         |
17+15       3.2343      7.77  |      Q  |         |      V  |         |
17+20       3.2848      7.32  |      Q  |         |       V |         |
17+25       3.3321      6.87  |     Q   |         |       V |         |
17+30       3.3761      6.39  |     Q   |         |        V|         |
17+35       3.4179      6.08  |     Q   |         |        V|         |
17+40       3.4576      5.77  |    Q    |         |        V|         |
17+45       3.4953      5.46  |    Q    |         |         V         |
17+50       3.5306      5.14  |    Q    |         |         V         |
17+55       3.5641      4.86  |   Q     |         |         V         |
18+ 0       3.5962      4.66  |   Q     |         |         |V        |
18+ 5       3.6265      4.40  |   Q     |         |         |V        |
18+10       3.6562      4.30  |   Q     |         |         |V        |
18+15       3.6851      4.20  |   Q     |         |         |V        |
18+20       3.7121      3.92  |  Q      |         |         | V       |
18+25       3.7382      3.79  |  Q      |         |         | V       |
18+30       3.7639      3.73  |  Q      |         |         | V       |
18+35       3.7890      3.65  |  Q      |         |         | V       |
18+40       3.8135      3.56  |  Q      |         |         | V       |
18+45       3.8377      3.50  |  Q      |         |         |  V      |
18+50       3.8610      3.39  |  Q      |         |         |  V      |
18+55       3.8829      3.17  |  Q      |         |         |  V      |
19+ 0       3.9043      3.11  |  Q      |         |         |  V      |
19+ 5       3.9253      3.06  |  Q      |         |         |  V      |
19+10       3.9458      2.98  | Q       |         |         |   V     |
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19+15       3.9659      2.92  | Q       |         |         |   V     |
19+20       3.9857      2.88  | Q       |         |         |   V     |
19+25       4.0049      2.78  | Q       |         |         |   V     |
19+30       4.0233      2.68  | Q       |         |         |   V     |
19+35       4.0415      2.64  | Q       |         |         |   V     |
19+40       4.0594      2.60  | Q       |         |         |    V    |
19+45       4.0768      2.52  | Q       |         |         |    V    |
19+50       4.0938      2.48  | Q       |         |         |    V    |
19+55       4.1106      2.44  | Q       |         |         |    V    |
20+ 0       4.1266      2.32  | Q       |         |         |    V    |
20+ 5       4.1421      2.26  | Q       |         |         |    V    |
20+10       4.1575      2.23  | Q       |         |         |    V    |
20+15       4.1724      2.17  | Q       |         |         |     V   |
20+20       4.1870      2.11  | Q       |         |         |     V   |
20+25       4.2013      2.09  | Q       |         |         |     V   |
20+30       4.2155      2.06  | Q       |         |         |     V   |
20+35       4.2296      2.04  | Q       |         |         |     V   |
20+40       4.2434      2.02  | Q       |         |         |     V   |
20+45       4.2572      1.99  |Q        |         |         |     V   |
20+50       4.2707      1.97  |Q        |         |         |     V   |
20+55       4.2841      1.95  |Q        |         |         |     V   |
21+ 0       4.2974      1.93  |Q        |         |         |      V  |
21+ 5       4.3105      1.90  |Q        |         |         |      V  |
21+10       4.3235      1.88  |Q        |         |         |      V  |
21+15       4.3363      1.86  |Q        |         |         |      V  |
21+20       4.3489      1.83  |Q        |         |         |      V  |
21+25       4.3612      1.79  |Q        |         |         |      V  |
21+30       4.3730      1.72  |Q        |         |         |      V  |
21+35       4.3826      1.39  |Q        |         |         |      V  |
21+40       4.3902      1.09  |Q        |         |         |      V  |
21+45       4.3975      1.07  |Q        |         |         |      V  |
21+50       4.4047      1.05  |Q        |         |         |       V |
21+55       4.4118      1.03  |Q        |         |         |       V |
22+ 0       4.4187      1.01  |Q        |         |         |       V |
22+ 5       4.4256      0.99  Q         |         |         |       V |
22+10       4.4323      0.98  Q         |         |         |       V |
22+15       4.4389      0.96  Q         |         |         |       V |
22+20       4.4455      0.95  Q         |         |         |       V |
22+25       4.4519      0.94  Q         |         |         |       V |
22+30       4.4583      0.93  Q         |         |         |       V |
22+35       4.4646      0.91  Q         |         |         |       V |
22+40       4.4708      0.90  Q         |         |         |       V |
22+45       4.4769      0.89  Q         |         |         |       V |
22+50       4.4830      0.88  Q         |         |         |       V |
22+55       4.4890      0.87  Q         |         |         |       V |
23+ 0       4.4950      0.86  Q         |         |         |       V |
23+ 5       4.5009      0.85  Q         |         |         |       V |
23+10       4.5067      0.85  Q         |         |         |       V |
23+15       4.5125      0.84  Q         |         |         |       V |
23+20       4.5182      0.83  Q         |         |         |        V|
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23+25	4.5238	0.82	Q	|	|	|	V|
23+30	4.5294	0.81	Q	|	|	|	V|
23+35	4.5350	0.81	Q	|	|	|	V|
23+40	4.5405	0.80	Q	|	|	|	V|
23+45	4.5459	0.79	Q	|	|	|	V|
23+50	4.5514	0.78	Q	|	|	|	V|
23+55	4.5567	0.78	Q	|	|	|	V|
24+ 0	4.5620	0.77	Q	|	|	|	V|
24+ 5	4.5672	0.75	Q	|	|	|	V|
24+10	4.5722	0.72	Q	|	|	|	V|
24+15	4.5768	0.67	Q	|	|	|	V|
24+20	4.5808	0.59	Q	|	|	|	V|
24+25	4.5843	0.51	Q	|	|	|	V|
24+30	4.5874	0.45	Q	|	|	|	V|
24+35	4.5902	0.40	Q	|	|	|	V|
24+40	4.5927	0.37	Q	|	|	|	V|
24+45	4.5950	0.34	Q	|	|	|	V|
24+50	4.5972	0.31	Q	|	|	|	V|
24+55	4.5992	0.29	Q	|	|	|	V|
25+ 0	4.6011	0.27	Q	|	|	|	V|
25+ 5	4.6028	0.26	Q	|	|	|	V|
25+10	4.6045	0.24	Q	|	|	|	V|
25+15	4.6061	0.23	Q	|	|	|	V|
25+20	4.6075	0.21	Q	|	|	|	V|
25+25	4.6089	0.20	Q	|	|	|	V|
25+30	4.6102	0.19	Q	|	|	|	V|
25+35	4.6115	0.18	Q	|	|	|	V|
25+40	4.6126	0.17	Q	|	|	|	V|
25+45	4.6137	0.16	Q	|	|	|	V|
25+50	4.6148	0.15	Q	|	|	|	V|
25+55	4.6158	0.14	Q	|	|	|	V|
26+ 0	4.6167	0.14	Q	|	|	|	V|
26+ 5	4.6176	0.13	Q	|	|	|	V|
26+10	4.6185	0.12	Q	|	|	|	V|
26+15	4.6193	0.12	Q	|	|	|	V|
26+20	4.6201	0.11	Q	|	|	|	V|
26+25	4.6208	0.11	Q	|	|	|	V|
26+30	4.6215	0.10	Q	|	|	|	V|
26+35	4.6222	0.10	Q	|	|	|	V|
26+40	4.6228	0.09	Q	|	|	|	V|
26+45	4.6234	0.09	Q	|	|	|	V|
26+50	4.6240	0.08	Q	|	|	|	V|
26+55	4.6245	0.08	Q	|	|	|	V|
27+ 0	4.6250	0.08	Q	|	|	|	V|
27+ 5	4.6255	0.07	Q	|	|	|	V|
27+10	4.6260	0.07	Q	|	|	|	V|
27+15	4.6264	0.06	Q	|	|	|	V|
27+20	4.6269	0.06	Q	|	|	|	V|
27+25	4.6273	0.06	Q	|	|	|	V|
27+30	4.6276	0.05	Q	|	|	|	V|

27+35	4.6280	0.05	Q				V
27+40	4.6283	0.05	Q				V
27+45	4.6286	0.05	Q				V
27+50	4.6289	0.04	Q				V
27+55	4.6292	0.04	Q				V
28+ 0	4.6294	0.04	Q				V
28+ 5	4.6297	0.03	Q				V
28+10	4.6299	0.03	Q				V
28+15	4.6301	0.03	Q				V
28+20	4.6303	0.03	Q				V
28+25	4.6305	0.03	Q				V
28+30	4.6306	0.02	Q				V
28+35	4.6308	0.02	Q				V
28+40	4.6309	0.02	Q				V
28+45	4.6311	0.02	Q				V
28+50	4.6312	0.02	Q				V
28+55	4.6313	0.01	Q				V
29+ 0	4.6314	0.01	Q				V
29+ 5	4.6314	0.01	Q				V
29+10	4.6315	0.01	Q				V
29+15	4.6315	0.01	Q				V
29+20	4.6316	0.00	Q				V
29+25	4.6316	0.00	Q				V
29+30	4.6316	0.00	Q				V

U n i t   H y d r o g r a p h   A n a l y s i s

Study date 04/01/21

++

San Bernardino County Synthetic Unit Hydrology Method
Manual date - August 1986

Program License Serial Number 6353

PROJECT LOKI
PROPOSED CONDITION 10-YR STORM

Storm Event Year = 10

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 10		
71.40	1	0.56
Rainfall data for year 10		
71.40	6	1.08
Rainfall data for year 10		
71.40	24	1.81

+++

******** Area-averaged max loss rate, Fm ********

SCS curve No.(AMCII)	SCS curve NO.(AMC 2)	Area (Ac.)	Area Fraction	Fp(Fig C6) (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	69.0	71.40	1.000	0.548	0.300	0.164

Area-averaged adjusted loss rate Fm (In/Hr) = 0.164

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
21.42	0.300	69.0	69.0	4.49	0.085
49.98	0.700	98.0	98.0	0.20	0.876

Area-averaged catchment yield fraction, Y = 0.639
Area-averaged low loss fraction, Yb = 0.361
User entry of time of concentration = 0.220 (hours)
++
Watershed area = 71.40(Ac.)
Catchment Lag time = 0.176 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 47.3485
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.164(In/Hr)
Average low loss rate fraction (Yb) = 0.361 (decimal)
MOUNTAIN S-Graph Selected
Computed peak 5-minute rainfall = 0.265(In)
Computed peak 30-minute rainfall = 0.454(In)
Specified peak 1-hour rainfall = 0.559(In)
Computed peak 3-hour rainfall = 0.837(In)
Specified peak 6-hour rainfall = 1.080(In)
Specified peak 24-hour rainfall = 1.810(In)

Rainfall depth area reduction factors:
Using a total area of 71.40(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.264(In)
30-minute factor = 0.997 Adjusted rainfall = 0.453(In)
1-hour factor = 0.997 Adjusted rainfall = 0.557(In)
3-hour factor = 1.000 Adjusted rainfall = 0.837(In)
6-hour factor = 1.000 Adjusted rainfall = 1.080(In)
24-hour factor = 1.000 Adjusted rainfall = 1.810(In)

U n i t H y d r o g r a p h
+++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 863.49 (CFS))	
1	7.186	62.049
2	35.546	244.890
3	54.752	165.842
4	64.236	81.891
5	70.726	56.040
6	75.680	42.778
7	79.492	32.920
8	82.437	25.424
9	84.856	20.889
10	86.880	17.481
11	88.750	16.141
12	90.317	13.536
13	91.745	12.333
14	93.016	10.969
15	94.173	9.991
16	95.177	8.669
17	96.063	7.648
18	96.915	7.359
19	97.767	7.359
20	98.619	7.359
21	99.472	7.359
22	100.000	4.563

Peak Unit Number	Adjusted mass rainfall (In)	Unit rainfall (In)
1	0.2644	0.2644
2	0.3255	0.0611
3	0.3676	0.0421
4	0.4007	0.0331
5	0.4284	0.0277
6	0.4525	0.0241
7	0.4739	0.0214
8	0.4933	0.0194
9	0.5111	0.0177
10	0.5275	0.0164
11	0.5428	0.0153
12	0.5571	0.0144
13	0.5739	0.0168
14	0.5898	0.0160
15	0.6051	0.0153
16	0.6197	0.0146
17	0.6338	0.0141
18	0.6474	0.0136
19	0.6605	0.0131
20	0.6731	0.0127

21	0.6854	0.0123
22	0.6973	0.0119
23	0.7089	0.0116
24	0.7201	0.0113
25	0.7311	0.0110
26	0.7418	0.0107
27	0.7522	0.0104
28	0.7624	0.0102
29	0.7724	0.0100
30	0.7821	0.0098
31	0.7917	0.0096
32	0.8010	0.0094
33	0.8102	0.0092
34	0.8192	0.0090
35	0.8281	0.0088
36	0.8367	0.0087
37	0.8452	0.0085
38	0.8536	0.0083
39	0.8618	0.0082
40	0.8698	0.0081
41	0.8778	0.0079
42	0.8856	0.0078
43	0.8933	0.0077
44	0.9009	0.0076
45	0.9083	0.0075
46	0.9157	0.0074
47	0.9230	0.0073
48	0.9301	0.0072
49	0.9372	0.0071
50	0.9442	0.0070
51	0.9511	0.0069
52	0.9579	0.0068
53	0.9647	0.0067
54	0.9713	0.0067
55	0.9779	0.0066
56	0.9844	0.0065
57	0.9908	0.0064
58	0.9972	0.0064
59	1.0035	0.0063
60	1.0097	0.0062
61	1.0159	0.0062
62	1.0220	0.0061
63	1.0280	0.0060
64	1.0340	0.0060
65	1.0399	0.0059
66	1.0457	0.0059
67	1.0515	0.0058
68	1.0573	0.0057
69	1.0630	0.0057
70	1.0686	0.0056

71	1.0742	0.0056
72	1.0798	0.0055
73	1.0853	0.0056
74	1.0908	0.0055
75	1.0963	0.0055
76	1.1017	0.0054
77	1.1071	0.0054
78	1.1124	0.0053
79	1.1177	0.0053
80	1.1230	0.0053
81	1.1282	0.0052
82	1.1334	0.0052
83	1.1385	0.0051
84	1.1436	0.0051
85	1.1486	0.0051
86	1.1537	0.0050
87	1.1586	0.0050
88	1.1636	0.0049
89	1.1685	0.0049
90	1.1734	0.0049
91	1.1782	0.0048
92	1.1830	0.0048
93	1.1878	0.0048
94	1.1925	0.0047
95	1.1972	0.0047
96	1.2019	0.0047
97	1.2066	0.0046
98	1.2112	0.0046
99	1.2158	0.0046
100	1.2203	0.0046
101	1.2249	0.0045
102	1.2294	0.0045
103	1.2339	0.0045
104	1.2383	0.0044
105	1.2427	0.0044
106	1.2471	0.0044
107	1.2515	0.0044
108	1.2558	0.0043
109	1.2602	0.0043
110	1.2645	0.0043
111	1.2687	0.0043
112	1.2730	0.0042
113	1.2772	0.0042
114	1.2814	0.0042
115	1.2856	0.0042
116	1.2897	0.0042
117	1.2939	0.0041
118	1.2980	0.0041
119	1.3021	0.0041
120	1.3061	0.0041

121	1.3102	0.0040
122	1.3142	0.0040
123	1.3182	0.0040
124	1.3222	0.0040
125	1.3261	0.0040
126	1.3301	0.0039
127	1.3340	0.0039
128	1.3379	0.0039
129	1.3418	0.0039
130	1.3457	0.0039
131	1.3495	0.0038
132	1.3533	0.0038
133	1.3571	0.0038
134	1.3609	0.0038
135	1.3647	0.0038
136	1.3685	0.0038
137	1.3722	0.0037
138	1.3759	0.0037
139	1.3796	0.0037
140	1.3833	0.0037
141	1.3870	0.0037
142	1.3907	0.0037
143	1.3943	0.0036
144	1.3979	0.0036
145	1.4015	0.0036
146	1.4051	0.0036
147	1.4087	0.0036
148	1.4123	0.0036
149	1.4158	0.0035
150	1.4193	0.0035
151	1.4229	0.0035
152	1.4264	0.0035
153	1.4299	0.0035
154	1.4333	0.0035
155	1.4368	0.0035
156	1.4402	0.0034
157	1.4437	0.0034
158	1.4471	0.0034
159	1.4505	0.0034
160	1.4539	0.0034
161	1.4573	0.0034
162	1.4606	0.0034
163	1.4640	0.0034
164	1.4673	0.0033
165	1.4707	0.0033
166	1.4740	0.0033
167	1.4773	0.0033
168	1.4806	0.0033
169	1.4838	0.0033
170	1.4871	0.0033

171	1.4904	0.0033
172	1.4936	0.0032
173	1.4968	0.0032
174	1.5000	0.0032
175	1.5033	0.0032
176	1.5064	0.0032
177	1.5096	0.0032
178	1.5128	0.0032
179	1.5160	0.0032
180	1.5191	0.0031
181	1.5223	0.0031
182	1.5254	0.0031
183	1.5285	0.0031
184	1.5316	0.0031
185	1.5347	0.0031
186	1.5378	0.0031
187	1.5409	0.0031
188	1.5439	0.0031
189	1.5470	0.0031
190	1.5500	0.0030
191	1.5531	0.0030
192	1.5561	0.0030
193	1.5591	0.0030
194	1.5621	0.0030
195	1.5651	0.0030
196	1.5681	0.0030
197	1.5711	0.0030
198	1.5740	0.0030
199	1.5770	0.0030
200	1.5799	0.0029
201	1.5829	0.0029
202	1.5858	0.0029
203	1.5887	0.0029
204	1.5916	0.0029
205	1.5945	0.0029
206	1.5974	0.0029
207	1.6003	0.0029
208	1.6032	0.0029
209	1.6061	0.0029
210	1.6089	0.0029
211	1.6118	0.0029
212	1.6146	0.0028
213	1.6174	0.0028
214	1.6203	0.0028
215	1.6231	0.0028
216	1.6259	0.0028
217	1.6287	0.0028
218	1.6315	0.0028
219	1.6343	0.0028
220	1.6370	0.0028

221	1.6398	0.0028
222	1.6426	0.0028
223	1.6453	0.0028
224	1.6481	0.0027
225	1.6508	0.0027
226	1.6535	0.0027
227	1.6563	0.0027
228	1.6590	0.0027
229	1.6617	0.0027
230	1.6644	0.0027
231	1.6671	0.0027
232	1.6698	0.0027
233	1.6724	0.0027
234	1.6751	0.0027
235	1.6778	0.0027
236	1.6804	0.0027
237	1.6831	0.0026
238	1.6857	0.0026
239	1.6884	0.0026
240	1.6910	0.0026
241	1.6936	0.0026
242	1.6962	0.0026
243	1.6988	0.0026
244	1.7014	0.0026
245	1.7040	0.0026
246	1.7066	0.0026
247	1.7092	0.0026
248	1.7118	0.0026
249	1.7143	0.0026
250	1.7169	0.0026
251	1.7195	0.0026
252	1.7220	0.0025
253	1.7245	0.0025
254	1.7271	0.0025
255	1.7296	0.0025
256	1.7321	0.0025
257	1.7347	0.0025
258	1.7372	0.0025
259	1.7397	0.0025
260	1.7422	0.0025
261	1.7447	0.0025
262	1.7472	0.0025
263	1.7496	0.0025
264	1.7521	0.0025
265	1.7546	0.0025
266	1.7570	0.0025
267	1.7595	0.0025
268	1.7620	0.0025
269	1.7644	0.0024
270	1.7668	0.0024

271	1.7693	0.0024
272	1.7717	0.0024
273	1.7741	0.0024
274	1.7765	0.0024
275	1.7790	0.0024
276	1.7814	0.0024
277	1.7838	0.0024
278	1.7862	0.0024
279	1.7886	0.0024
280	1.7909	0.0024
281	1.7933	0.0024
282	1.7957	0.0024
283	1.7981	0.0024
284	1.8004	0.0024
285	1.8028	0.0024
286	1.8051	0.0024
287	1.8075	0.0023
288	1.8098	0.0023

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0023	0.0008	0.0015
2	0.0023	0.0008	0.0015
3	0.0024	0.0009	0.0015
4	0.0024	0.0009	0.0015
5	0.0024	0.0009	0.0015
6	0.0024	0.0009	0.0015
7	0.0024	0.0009	0.0015
8	0.0024	0.0009	0.0015
9	0.0024	0.0009	0.0015
10	0.0024	0.0009	0.0015
11	0.0024	0.0009	0.0015
12	0.0024	0.0009	0.0016
13	0.0024	0.0009	0.0016
14	0.0024	0.0009	0.0016
15	0.0025	0.0009	0.0016
16	0.0025	0.0009	0.0016
17	0.0025	0.0009	0.0016
18	0.0025	0.0009	0.0016
19	0.0025	0.0009	0.0016
20	0.0025	0.0009	0.0016
21	0.0025	0.0009	0.0016
22	0.0025	0.0009	0.0016
23	0.0025	0.0009	0.0016
24	0.0025	0.0009	0.0016
25	0.0025	0.0009	0.0016
26	0.0026	0.0009	0.0016
27	0.0026	0.0009	0.0016

28	0.0026	0.0009	0.0016
29	0.0026	0.0009	0.0017
30	0.0026	0.0009	0.0017
31	0.0026	0.0009	0.0017
32	0.0026	0.0009	0.0017
33	0.0026	0.0009	0.0017
34	0.0026	0.0010	0.0017
35	0.0026	0.0010	0.0017
36	0.0027	0.0010	0.0017
37	0.0027	0.0010	0.0017
38	0.0027	0.0010	0.0017
39	0.0027	0.0010	0.0017
40	0.0027	0.0010	0.0017
41	0.0027	0.0010	0.0017
42	0.0027	0.0010	0.0017
43	0.0027	0.0010	0.0017
44	0.0027	0.0010	0.0018
45	0.0028	0.0010	0.0018
46	0.0028	0.0010	0.0018
47	0.0028	0.0010	0.0018
48	0.0028	0.0010	0.0018
49	0.0028	0.0010	0.0018
50	0.0028	0.0010	0.0018
51	0.0028	0.0010	0.0018
52	0.0028	0.0010	0.0018
53	0.0029	0.0010	0.0018
54	0.0029	0.0010	0.0018
55	0.0029	0.0010	0.0018
56	0.0029	0.0010	0.0018
57	0.0029	0.0011	0.0019
58	0.0029	0.0011	0.0019
59	0.0029	0.0011	0.0019
60	0.0029	0.0011	0.0019
61	0.0030	0.0011	0.0019
62	0.0030	0.0011	0.0019
63	0.0030	0.0011	0.0019
64	0.0030	0.0011	0.0019
65	0.0030	0.0011	0.0019
66	0.0030	0.0011	0.0019
67	0.0031	0.0011	0.0020
68	0.0031	0.0011	0.0020
69	0.0031	0.0011	0.0020
70	0.0031	0.0011	0.0020
71	0.0031	0.0011	0.0020
72	0.0031	0.0011	0.0020
73	0.0031	0.0011	0.0020
74	0.0032	0.0011	0.0020
75	0.0032	0.0011	0.0020
76	0.0032	0.0012	0.0020
77	0.0032	0.0012	0.0021

78	0.0032	0.0012	0.0021
79	0.0033	0.0012	0.0021
80	0.0033	0.0012	0.0021
81	0.0033	0.0012	0.0021
82	0.0033	0.0012	0.0021
83	0.0033	0.0012	0.0021
84	0.0033	0.0012	0.0021
85	0.0034	0.0012	0.0022
86	0.0034	0.0012	0.0022
87	0.0034	0.0012	0.0022
88	0.0034	0.0012	0.0022
89	0.0034	0.0012	0.0022
90	0.0035	0.0012	0.0022
91	0.0035	0.0013	0.0022
92	0.0035	0.0013	0.0022
93	0.0035	0.0013	0.0023
94	0.0035	0.0013	0.0023
95	0.0036	0.0013	0.0023
96	0.0036	0.0013	0.0023
97	0.0036	0.0013	0.0023
98	0.0036	0.0013	0.0023
99	0.0037	0.0013	0.0023
100	0.0037	0.0013	0.0024
101	0.0037	0.0013	0.0024
102	0.0037	0.0014	0.0024
103	0.0038	0.0014	0.0024
104	0.0038	0.0014	0.0024
105	0.0038	0.0014	0.0024
106	0.0038	0.0014	0.0025
107	0.0039	0.0014	0.0025
108	0.0039	0.0014	0.0025
109	0.0039	0.0014	0.0025
110	0.0040	0.0014	0.0025
111	0.0040	0.0014	0.0026
112	0.0040	0.0015	0.0026
113	0.0041	0.0015	0.0026
114	0.0041	0.0015	0.0026
115	0.0041	0.0015	0.0026
116	0.0042	0.0015	0.0027
117	0.0042	0.0015	0.0027
118	0.0042	0.0015	0.0027
119	0.0043	0.0015	0.0027
120	0.0043	0.0016	0.0027
121	0.0043	0.0016	0.0028
122	0.0044	0.0016	0.0028
123	0.0044	0.0016	0.0028
124	0.0044	0.0016	0.0028
125	0.0045	0.0016	0.0029
126	0.0045	0.0016	0.0029
127	0.0046	0.0017	0.0029

128	0.0046	0.0017	0.0030
129	0.0047	0.0017	0.0030
130	0.0047	0.0017	0.0030
131	0.0048	0.0017	0.0031
132	0.0048	0.0017	0.0031
133	0.0049	0.0018	0.0031
134	0.0049	0.0018	0.0031
135	0.0050	0.0018	0.0032
136	0.0050	0.0018	0.0032
137	0.0051	0.0018	0.0033
138	0.0051	0.0019	0.0033
139	0.0052	0.0019	0.0033
140	0.0053	0.0019	0.0034
141	0.0053	0.0019	0.0034
142	0.0054	0.0019	0.0034
143	0.0055	0.0020	0.0035
144	0.0055	0.0020	0.0035
145	0.0055	0.0020	0.0035
146	0.0056	0.0020	0.0036
147	0.0057	0.0021	0.0036
148	0.0057	0.0021	0.0037
149	0.0059	0.0021	0.0037
150	0.0059	0.0021	0.0038
151	0.0060	0.0022	0.0039
152	0.0061	0.0022	0.0039
153	0.0062	0.0022	0.0040
154	0.0063	0.0023	0.0040
155	0.0064	0.0023	0.0041
156	0.0065	0.0023	0.0042
157	0.0067	0.0024	0.0043
158	0.0067	0.0024	0.0043
159	0.0069	0.0025	0.0044
160	0.0070	0.0025	0.0045
161	0.0072	0.0026	0.0046
162	0.0073	0.0026	0.0046
163	0.0075	0.0027	0.0048
164	0.0076	0.0027	0.0048
165	0.0078	0.0028	0.0050
166	0.0079	0.0029	0.0051
167	0.0082	0.0030	0.0052
168	0.0083	0.0030	0.0053
169	0.0087	0.0031	0.0055
170	0.0088	0.0032	0.0056
171	0.0092	0.0033	0.0059
172	0.0094	0.0034	0.0060
173	0.0098	0.0035	0.0062
174	0.0100	0.0036	0.0064
175	0.0104	0.0038	0.0067
176	0.0107	0.0039	0.0068
177	0.0113	0.0041	0.0072

178	0.0116	0.0042	0.0074
179	0.0123	0.0044	0.0078
180	0.0127	0.0046	0.0081
181	0.0136	0.0049	0.0087
182	0.0141	0.0051	0.0090
183	0.0153	0.0055	0.0098
184	0.0160	0.0058	0.0102
185	0.0144	0.0052	0.0092
186	0.0153	0.0055	0.0098
187	0.0177	0.0064	0.0113
188	0.0194	0.0070	0.0124
189	0.0241	0.0087	0.0154
190	0.0277	0.0100	0.0177
191	0.0421	0.0137	0.0284
192	0.0611	0.0137	0.0474
193	0.2644	0.0137	0.2507
194	0.0331	0.0120	0.0212
195	0.0214	0.0077	0.0137
196	0.0164	0.0059	0.0105
197	0.0168	0.0061	0.0107
198	0.0146	0.0053	0.0093
199	0.0131	0.0047	0.0084
200	0.0119	0.0043	0.0076
201	0.0110	0.0040	0.0070
202	0.0102	0.0037	0.0065
203	0.0096	0.0034	0.0061
204	0.0090	0.0033	0.0058
205	0.0085	0.0031	0.0054
206	0.0081	0.0029	0.0052
207	0.0077	0.0028	0.0049
208	0.0074	0.0027	0.0047
209	0.0071	0.0026	0.0045
210	0.0068	0.0025	0.0044
211	0.0066	0.0024	0.0042
212	0.0064	0.0023	0.0041
213	0.0062	0.0022	0.0039
214	0.0060	0.0022	0.0038
215	0.0058	0.0021	0.0037
216	0.0056	0.0020	0.0036
217	0.0056	0.0020	0.0036
218	0.0054	0.0020	0.0035
219	0.0053	0.0019	0.0034
220	0.0052	0.0019	0.0033
221	0.0051	0.0018	0.0032
222	0.0049	0.0018	0.0032
223	0.0048	0.0017	0.0031
224	0.0047	0.0017	0.0030
225	0.0046	0.0017	0.0030
226	0.0046	0.0016	0.0029
227	0.0045	0.0016	0.0029

228	0.0044	0.0016	0.0028
229	0.0043	0.0016	0.0028
230	0.0042	0.0015	0.0027
231	0.0042	0.0015	0.0027
232	0.0041	0.0015	0.0026
233	0.0040	0.0015	0.0026
234	0.0040	0.0014	0.0025
235	0.0039	0.0014	0.0025
236	0.0039	0.0014	0.0025
237	0.0038	0.0014	0.0024
238	0.0038	0.0014	0.0024
239	0.0037	0.0013	0.0024
240	0.0037	0.0013	0.0023
241	0.0036	0.0013	0.0023
242	0.0036	0.0013	0.0023
243	0.0035	0.0013	0.0022
244	0.0035	0.0013	0.0022
245	0.0034	0.0012	0.0022
246	0.0034	0.0012	0.0022
247	0.0034	0.0012	0.0021
248	0.0033	0.0012	0.0021
249	0.0033	0.0012	0.0021
250	0.0032	0.0012	0.0021
251	0.0032	0.0012	0.0020
252	0.0032	0.0011	0.0020
253	0.0031	0.0011	0.0020
254	0.0031	0.0011	0.0020
255	0.0031	0.0011	0.0020
256	0.0030	0.0011	0.0019
257	0.0030	0.0011	0.0019
258	0.0030	0.0011	0.0019
259	0.0030	0.0011	0.0019
260	0.0029	0.0011	0.0019
261	0.0029	0.0010	0.0019
262	0.0029	0.0010	0.0018
263	0.0029	0.0010	0.0018
264	0.0028	0.0010	0.0018
265	0.0028	0.0010	0.0018
266	0.0028	0.0010	0.0018
267	0.0028	0.0010	0.0018
268	0.0027	0.0010	0.0017
269	0.0027	0.0010	0.0017
270	0.0027	0.0010	0.0017
271	0.0027	0.0010	0.0017
272	0.0026	0.0010	0.0017
273	0.0026	0.0009	0.0017
274	0.0026	0.0009	0.0017
275	0.0026	0.0009	0.0016
276	0.0026	0.0009	0.0016
277	0.0025	0.0009	0.0016

278	0.0025	0.0009	0.0016
279	0.0025	0.0009	0.0016
280	0.0025	0.0009	0.0016
281	0.0025	0.0009	0.0016
282	0.0025	0.0009	0.0016
283	0.0024	0.0009	0.0016
284	0.0024	0.0009	0.0015
285	0.0024	0.0009	0.0015
286	0.0024	0.0009	0.0015
287	0.0024	0.0009	0.0015
288	0.0024	0.0009	0.0015

Total soil rain loss = 0.56(In)

Total effective rainfall = 1.25(In)

Peak flow rate in flood hydrograph = 76.53(CFS)

+++

24 - H O U R   S T O R M

R u n o f f   H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	20.0	40.0	60.0	80.0
0+ 5	0.0006	0.09	Q	|	|	|	|
0+10	0.0038	0.46	Q	|	|	|	|
0+15	0.0087	0.71	Q	|	|	|	|
0+20	0.0144	0.83	Q	|	|	|	|
0+25	0.0208	0.92	Q	|	|	|	|
0+30	0.0276	0.99	Q	|	|	|	|
0+35	0.0348	1.04	Q	|	|	|	|
0+40	0.0422	1.08	Q	|	|	|	|
0+45	0.0499	1.12	Q	|	|	|	|
0+50	0.0578	1.15	Q	|	|	|	|
0+55	0.0659	1.18	Q	|	|	|	|
1+ 0	0.0742	1.20	Q	|	|	|	|
1+ 5	0.0826	1.22	Q	|	|	|	|
1+10	0.0911	1.24	Q	|	|	|	|
1+15	0.0998	1.26	Q	|	|	|	|
1+20	0.1086	1.28	Q	|	|	|	|
1+25	0.1176	1.30	Q	|	|	|	|
1+30	0.1266	1.31	Q	|	|	|	|
1+35	0.1357	1.33	Q	|	|	|	|
1+40	0.1450	1.34	Q	|	|	|	|
1+45	0.1543	1.36	Q	|	|	|	|
1+50	0.1637	1.37	Q	|	|	|	|
1+55	0.1732	1.37	Q	|	|	|	|
2+ 0	0.1827	1.38	Q	|	|	|	|

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 2+ 5       0.1922      1.38  QV         |         |         |         |
 2+10       0.2018      1.39  QV         |         |         |         |
 2+15       0.2114      1.39  QV         |         |         |         |
 2+20       0.2211      1.40  QV         |         |         |         |
 2+25       0.2307      1.41  QV         |         |         |         |
 2+30       0.2405      1.41  QV         |         |         |         |
 2+35       0.2502      1.42  QV         |         |         |         |
 2+40       0.2600      1.42  QV         |         |         |         |
 2+45       0.2698      1.43  QV         |         |         |         |
 2+50       0.2797      1.43  QV         |         |         |         |
 2+55       0.2896      1.44  QV         |         |         |         |
 3+ 0       0.2995      1.44  QV         |         |         |         |
 3+ 5       0.3095      1.45  QV         |         |         |         |
 3+10       0.3195      1.45  QV         |         |         |         |
 3+15       0.3296      1.46  QV         |         |         |         |
 3+20       0.3397      1.47  QV         |         |         |         |
 3+25       0.3498      1.47  QV         |         |         |         |
 3+30       0.3600      1.48  QV         |         |         |         |
 3+35       0.3702      1.48  QV         |         |         |         |
 3+40       0.3805      1.49  Q V        |         |         |         |
 3+45       0.3908      1.50  Q V        |         |         |         |
 3+50       0.4011      1.50  Q V        |         |         |         |
 3+55       0.4115      1.51  Q V        |         |         |         |
 4+ 0       0.4220      1.52  Q V        |         |         |         |
 4+ 5       0.4324      1.52  Q V        |         |         |         |
 4+10       0.4430      1.53  Q V        |         |         |         |
 4+15       0.4535      1.53  Q V        |         |         |         |
 4+20       0.4641      1.54  Q V        |         |         |         |
 4+25       0.4748      1.55  Q V        |         |         |         |
 4+30       0.4855      1.55  Q V        |         |         |         |
 4+35       0.4963      1.56  Q V        |         |         |         |
 4+40       0.5071      1.57  Q V        |         |         |         |
 4+45       0.5179      1.58  Q V        |         |         |         |
 4+50       0.5288      1.58  Q V        |         |         |         |
 4+55       0.5398      1.59  Q V        |         |         |         |
 5+ 0       0.5508      1.60  Q V        |         |         |         |
 5+ 5       0.5618      1.60  Q  V       |         |         |         |
 5+10       0.5729      1.61  Q  V       |         |         |         |
 5+15       0.5841      1.62  Q  V       |         |         |         |
 5+20       0.5953      1.63  Q  V       |         |         |         |
 5+25       0.6066      1.64  Q  V       |         |         |         |
 5+30       0.6179      1.64  Q  V       |         |         |         |
 5+35       0.6292      1.65  Q  V       |         |         |         |
 5+40       0.6407      1.66  Q  V       |         |         |         |
 5+45       0.6522      1.67  Q  V       |         |         |         |
 5+50       0.6637      1.68  Q  V       |         |         |         |
 5+55       0.6753      1.68  Q  V       |         |         |         |
 6+ 0       0.6869      1.69  Q  V       |         |         |         |
 6+ 5       0.6986      1.70  Q  V       |         |         |         |
 6+10       0.7104      1.71  Q  V       |         |         |         |
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 6+15        0.7223      1.72  Q  V       |         |         |         |
 6+20        0.7341      1.73  Q  V       |         |         |         |
 6+25        0.7461      1.74  Q   V      |         |         |         |
 6+30        0.7581      1.75  Q   V      |         |         |         |
 6+35        0.7702      1.75  Q   V      |         |         |         |
 6+40        0.7824      1.76  Q   V      |         |         |         |
 6+45        0.7946      1.77  Q   V      |         |         |         |
 6+50        0.8069      1.78  Q   V      |         |         |         |
 6+55        0.8192      1.79  Q   V      |         |         |         |
 7+ 0        0.8316      1.80  Q   V      |         |         |         |
 7+ 5        0.8441      1.81  Q   V      |         |         |         |
 7+10        0.8567      1.82  Q   V      |         |         |         |
 7+15        0.8693      1.83  Q   V      |         |         |         |
 7+20        0.8820      1.84  Q   V      |         |         |         |
 7+25        0.8948      1.85  Q   V      |         |         |         |
 7+30        0.9076      1.87  Q   V      |         |         |         |
 7+35        0.9205      1.88  Q   V      |         |         |         |
 7+40        0.9336      1.89  Q    V     |         |         |         |
 7+45        0.9466      1.90  Q    V     |         |         |         |
 7+50        0.9598      1.91  Q    V     |         |         |         |
 7+55        0.9730      1.92  Q    V     |         |         |         |
 8+ 0        0.9864      1.94  Q    V     |         |         |         |
 8+ 5        0.9998      1.95  Q    V     |         |         |         |
 8+10        1.0133      1.96  Q    V     |         |         |         |
 8+15        1.0269      1.97  Q    V     |         |         |         |
 8+20        1.0405      1.98  Q    V     |         |         |         |
 8+25        1.0543      2.00  Q    V     |         |         |         |
 8+30        1.0681      2.01  |Q   V     |         |         |         |
 8+35        1.0821      2.02  |Q   V     |         |         |         |
 8+40        1.0961      2.04  |Q   V     |         |         |         |
 8+45        1.1102      2.05  |Q   V     |         |         |         |
 8+50        1.1245      2.07  |Q    V    |         |         |         |
 8+55        1.1388      2.08  |Q    V    |         |         |         |
 9+ 0        1.1532      2.10  |Q    V    |         |         |         |
 9+ 5        1.1678      2.11  |Q    V    |         |         |         |
 9+10        1.1824      2.13  |Q    V    |         |         |         |
 9+15        1.1972      2.14  |Q    V    |         |         |         |
 9+20        1.2120      2.16  |Q    V    |         |         |         |
 9+25        1.2270      2.17  |Q    V    |         |         |         |
 9+30        1.2421      2.19  |Q    V    |         |         |         |
 9+35        1.2572      2.21  |Q    V    |         |         |         |
 9+40        1.2726      2.22  |Q    V    |         |         |         |
 9+45        1.2880      2.24  |Q    V    |         |         |         |
 9+50        1.3036      2.26  |Q     V   |         |         |         |
 9+55        1.3192      2.28  |Q     V   |         |         |         |
10+ 0        1.3350      2.30  |Q     V   |         |         |         |
10+ 5        1.3510      2.31  |Q     V   |         |         |         |
10+10        1.3671      2.33  |Q     V   |         |         |         |
10+15        1.3833      2.35  |Q     V   |         |         |         |
10+20        1.3996      2.37  |Q     V   |         |         |         |
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10+25       1.4161      2.39  |Q     V  |         |         |         |
10+30       1.4328      2.42  |Q     V  |         |         |         |
10+35       1.4495      2.44  |Q     V  |         |         |         |
10+40       1.4665      2.46  |Q     V  |         |         |         |
10+45       1.4836      2.48  |Q     V  |         |         |         |
10+50       1.5009      2.51  |Q      V |         |         |         |
10+55       1.5183      2.53  |Q      V |         |         |         |
11+ 0       1.5359      2.56  |Q      V |         |         |         |
11+ 5       1.5536      2.58  |Q      V |         |         |         |
11+10       1.5716      2.61  |Q      V |         |         |         |
11+15       1.5897      2.63  |Q      V |         |         |         |
11+20       1.6080      2.66  |Q      V |         |         |         |
11+25       1.6265      2.69  |Q      V |         |         |         |
11+30       1.6453      2.72  |Q      V |         |         |         |
11+35       1.6642      2.75  |Q      V |         |         |         |
11+40       1.6833      2.78  |Q       V|         |         |         |
11+45       1.7026      2.81  |Q       V|         |         |         |
11+50       1.7222      2.84  |Q       V|         |         |         |
11+55       1.7420      2.87  |Q       V|         |         |         |
12+ 0       1.7620      2.91  |Q       V|         |         |         |
12+ 5       1.7822      2.94  |Q       V|         |         |         |
12+10       1.8027      2.97  |Q       V|         |         |         |
12+15       1.8233      2.99  |Q       V|         |         |         |
12+20       1.8441      3.03  |Q       V|         |         |         |
12+25       1.8653      3.07  |Q        V         |         |         |
12+30       1.8867      3.11  |Q        V         |         |         |
12+35       1.9084      3.15  |Q        V         |         |         |
12+40       1.9304      3.19  |Q        V         |         |         |
12+45       1.9526      3.24  |Q        V         |         |         |
12+50       1.9753      3.29  |Q        V         |         |         |
12+55       1.9982      3.33  |Q        V         |         |         |
13+ 0       2.0216      3.39  |Q        V         |         |         |
13+ 5       2.0452      3.44  |Q        |V        |         |         |
13+10       2.0693      3.50  |Q        |V        |         |         |
13+15       2.0938      3.55  |Q        |V        |         |         |
13+20       2.1187      3.62  |Q        |V        |         |         |
13+25       2.1440      3.68  |Q        |V        |         |         |
13+30       2.1698      3.75  |Q        |V        |         |         |
13+35       2.1961      3.82  |Q        |V        |         |         |
13+40       2.2229      3.89  |Q        |V        |         |         |
13+45       2.2503      3.97  |Q        | V       |         |         |
13+50       2.2782      4.05  | Q       | V       |         |         |
13+55       2.3067      4.14  | Q       | V       |         |         |
14+ 0       2.3358      4.23  | Q       | V       |         |         |
14+ 5       2.3657      4.33  | Q       | V       |         |         |
14+10       2.3963      4.45  | Q       | V       |         |         |
14+15       2.4277      4.56  | Q       |  V      |         |         |
14+20       2.4600      4.69  | Q       |  V      |         |         |
14+25       2.4931      4.81  | Q       |  V      |         |         |
14+30       2.5272      4.96  | Q       |  V      |         |         |
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14+35       2.5624      5.10  | Q       |  V      |         |         |
14+40       2.5986      5.27  | Q       |   V     |         |         |
14+45       2.6361      5.44  | Q       |   V     |         |         |
14+50       2.6749      5.63  | Q       |   V     |         |         |
14+55       2.7151      5.84  | Q       |   V     |         |         |
15+ 0       2.7569      6.08  |  Q      |   V     |         |         |
15+ 5       2.8005      6.33  |  Q      |    V    |         |         |
15+10       2.8461      6.63  |  Q      |    V    |         |         |
15+15       2.8940      6.95  |  Q      |    V    |         |         |
15+20       2.9445      7.34  |  Q      |    V    |         |         |
15+25       2.9970      7.63  |  Q      |     V   |         |         |
15+30       3.0496      7.64  |  Q      |     V   |         |         |
15+35       3.1038      7.87  |  Q      |     V   |         |         |
15+40       3.1621      8.45  |   Q     |      V  |         |         |
15+45       3.2257      9.24  |   Q     |      V  |         |         |
15+50       3.2980     10.49  |    Q    |      V  |         |         |
15+55       3.3838     12.46  |     Q   |       V |         |         |
16+ 0       3.5013     17.06  |       Q |       V |         |         |
16+ 5       3.7534     36.60  |         |       Q V         |         |
16+10       4.2805     76.53  |         |         |  V      |       Q |
16+15       4.6663     56.02  |         |         |    V  Q |         |
16+20       4.9027     34.33  |         |      Q  |     V   |         |
16+25       5.0837     26.27  |         |  Q      |      V  |         |
16+30       5.2351     21.99  |         Q         |       V |         |
16+35       5.3637     18.67  |        Q|         |       V |         |
16+40       5.4739     16.00  |       Q |         |        V|         |
16+45       5.5714     14.16  |      Q  |         |         V         |
16+50       5.6590     12.72  |     Q   |         |         V         |
16+55       5.7404     11.81  |    Q    |         |         V         |
17+ 0       5.8141     10.71  |    Q    |         |         |V        |
17+ 5       5.8827      9.96  |   Q     |         |         |V        |
17+10       5.9463      9.23  |   Q     |         |         | V       |
17+15       6.0057      8.63  |   Q     |         |         | V       |
17+20       6.0608      7.99  |  Q      |         |         | V       |
17+25       6.1123      7.47  |  Q      |         |         | V       |
17+30       6.1615      7.14  |  Q      |         |         |  V      |
17+35       6.2089      6.89  |  Q      |         |         |  V      |
17+40       6.2545      6.61  |  Q      |         |         |  V      |
17+45       6.2975      6.25  |  Q      |         |         |  V      |
17+50       6.3337      5.25  | Q       |         |         |   V     |
17+55       6.3610      3.97  |Q        |         |         |   V     |
18+ 0       6.3869      3.76  |Q        |         |         |   V     |
18+ 5       6.4118      3.61  |Q        |         |         |   V     |
18+10       6.4358      3.49  |Q        |         |         |   V     |
18+15       6.4591      3.38  |Q        |         |         |   V     |
18+20       6.4816      3.27  |Q        |         |         |   V     |
18+25       6.5034      3.17  |Q        |         |         |    V    |
18+30       6.5246      3.08  |Q        |         |         |    V    |
18+35       6.5453      3.00  |Q        |         |         |    V    |
18+40       6.5654      2.92  |Q        |         |         |    V    |
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18+45       6.5850      2.85  |Q        |         |         |    V    |
18+50       6.6042      2.78  |Q        |         |         |    V    |
18+55       6.6230      2.72  |Q        |         |         |    V    |
19+ 0       6.6413      2.66  |Q        |         |         |    V    |
19+ 5       6.6593      2.61  |Q        |         |         |    V    |
19+10       6.6769      2.56  |Q        |         |         |    V    |
19+15       6.6941      2.51  |Q        |         |         |     V   |
19+20       6.7111      2.46  |Q        |         |         |     V   |
19+25       6.7277      2.42  |Q        |         |         |     V   |
19+30       6.7441      2.37  |Q        |         |         |     V   |
19+35       6.7601      2.33  |Q        |         |         |     V   |
19+40       6.7759      2.29  |Q        |         |         |     V   |
19+45       6.7915      2.26  |Q        |         |         |     V   |
19+50       6.8068      2.22  |Q        |         |         |     V   |
19+55       6.8218      2.19  |Q        |         |         |     V   |
20+ 0       6.8367      2.15  |Q        |         |         |     V   |
20+ 5       6.8513      2.12  |Q        |         |         |     V   |
20+10       6.8657      2.09  |Q        |         |         |      V  |
20+15       6.8799      2.06  |Q        |         |         |      V  |
20+20       6.8939      2.03  |Q        |         |         |      V  |
20+25       6.9077      2.01  |Q        |         |         |      V  |
20+30       6.9214      1.98  Q         |         |         |      V  |
20+35       6.9348      1.96  Q         |         |         |      V  |
20+40       6.9481      1.93  Q         |         |         |      V  |
20+45       6.9612      1.91  Q         |         |         |      V  |
20+50       6.9742      1.88  Q         |         |         |      V  |
20+55       6.9870      1.86  Q         |         |         |      V  |
21+ 0       6.9997      1.84  Q         |         |         |      V  |
21+ 5       7.0122      1.82  Q         |         |         |      V  |
21+10       7.0246      1.80  Q         |         |         |      V  |
21+15       7.0369      1.78  Q         |         |         |      V  |
21+20       7.0490      1.76  Q         |         |         |      V  |
21+25       7.0610      1.74  Q         |         |         |       V |
21+30       7.0728      1.72  Q         |         |         |       V |
21+35       7.0846      1.70  Q         |         |         |       V |
21+40       7.0962      1.69  Q         |         |         |       V |
21+45       7.1077      1.67  Q         |         |         |       V |
21+50       7.1191      1.65  Q         |         |         |       V |
21+55       7.1304      1.64  Q         |         |         |       V |
22+ 0       7.1416      1.62  Q         |         |         |       V |
22+ 5       7.1527      1.61  Q         |         |         |       V |
22+10       7.1636      1.59  Q         |         |         |       V |
22+15       7.1745      1.58  Q         |         |         |       V |
22+20       7.1853      1.56  Q         |         |         |       V |
22+25       7.1960      1.55  Q         |         |         |       V |
22+30       7.2065      1.54  Q         |         |         |       V |
22+35       7.2170      1.52  Q         |         |         |       V |
22+40       7.2275      1.51  Q         |         |         |       V |
22+45       7.2378      1.50  Q         |         |         |        V|
22+50       7.2480      1.49  Q         |         |         |        V|
```

```
   22+55        7.2582       1.47  Q          |         |         |        V|
   23+ 0        7.2682       1.46  Q          |         |         |        V|
   23+ 5        7.2782       1.45  Q          |         |         |        V|
   23+10        7.2881       1.44  Q          |         |         |        V|
   23+15        7.2980       1.43  Q          |         |         |        V|
   23+20        7.3078       1.42  Q          |         |         |        V|
   23+25        7.3174       1.41  Q          |         |         |        V|
   23+30        7.3271       1.40  Q          |         |         |        V|
   23+35        7.3366       1.39  Q          |         |         |        V|
   23+40        7.3461       1.38  Q          |         |         |        V|
   23+45        7.3555       1.37  Q          |         |         |        V|
   23+50        7.3648       1.36  Q          |         |         |        V|
   23+55        7.3741       1.35  Q          |         |         |        V|
   24+ 0        7.3833       1.34  Q          |         |         |        V|
   24+ 5        7.3918       1.24  Q          |         |         |        V|
   24+10        7.3978       0.86  Q          |         |         |        V|
   24+15        7.4020       0.61  Q          |         |         |        V|
   24+20        7.4053       0.48  Q          |         |         |        V|
   24+25        7.4080       0.39  Q          |         |         |        V|
   24+30        7.4102       0.33  Q          |         |         |        V|
   24+35        7.4121       0.28  Q          |         |         |        V|
   24+40        7.4138       0.24  Q          |         |         |        V|
   24+45        7.4152       0.20  Q          |         |         |        V|
   24+50        7.4164       0.18  Q          |         |         |        V|
   24+55        7.4174       0.15  Q          |         |         |        V|
   25+ 0        7.4183       0.13  Q          |         |         |        V|
   25+ 5        7.4191       0.11  Q          |         |         |        V|
   25+10        7.4197       0.09  Q          |         |         |        V|
   25+15        7.4202       0.08  Q          |         |         |        V|
   25+20        7.4207       0.06  Q          |         |         |        V|
   25+25        7.4210       0.05  Q          |         |         |        V|
   25+30        7.4213       0.04  Q          |         |         |        V|
   25+35        7.4215       0.03  Q          |         |         |        V|
   25+40        7.4216       0.02  Q          |         |         |        V|
   25+45        7.4217       0.01  Q          |         |         |         V
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APPENDIX E

BMP Details (refer to Preliminary Hydrology Report for Additional BMP Discussion)