Initial Study/Negative Declaration
for
Ocean Hills Senior Living

Lead Agency:

City of Oceanside
300 N. Coast Highway
Oceanside, California 92054

Prepared by:

Roma Environmental
romaenvironmental.com
roma@romaenvironmental.com
951-544-3170

May 24, 2019

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

PREFACE

The City of Oceanside, acting as Lead Agency for the California Environmental Quality Act (CEQA) documentation, released this Draft Initial Study (IS) and Negative Declaration (MND) for the Proposed Ocean Hills Senior Living Project for public review. The Draft IS/ND, along with a Notice of Intent (NOI) to adopt an ND, was circulated to various agencies, organizations and individuals for the required 30-day public review period.

INITIAL STUDY
City of Oceanside California

1. PROJECT	Ocean Hills Senior Living Project
2. LEAD AGENCY	City of Oceanside, California
3. CONTACT PERSON AND PHONE	Scott Nightingale, Senior Planner 760-435-3526
4. PROJECT LOCATION	Northern Corner of Cannon Road & Mystra Way, Oceanside, CA 92506 (APN 1695620100)
5. APPLICANT	Protea Senior Living Oceanside, LLC 18 Ventana Ridge Drive, Aliso Viejo, CA 92656
6. GENERAL PLAN DESIGNATION	General Commercial
7. ZONING DESIGNATION	(CL) Limited Commercial District

8. PROJECT DESCRIPTION

The proposed Senior Living Facility consists of two phases. Phase 1, which is situated on the southern 3.533 acres of the site, has already been approved by the City of Oceanside, construction has been completed, and a Certificate of Occupancy has been issued by the City of Oceanside. Phase 2, which has not yet been approved or constructed, will include construction of one new 103,004 square foot three-story building with 102 resident units on a 2.928 acre site. The project location is shown on Figure 1 and the site plan is shown on Figure 2.

Phase one is comprised of a two-story 81,764 square-foot two-story building. The building would be comprised of 114 residential units, to be used for senior age restricted living. The Phase 1 building also includes a reception area, a lobby, administrative offices, a kitchen, dining rooms, a coffee bar, an ice cream bar, beauty salon, recreational rooms, patios and miscellaneous utility rooms. A small dog park is also proposed as part of Phase 1. Phase 1, as shown on Figure 3

Fifty (50) parking stalls, including 2 electric vehicle spaces, 2 disabled access spaces, and 1 van accessible space have been included in the development of Phase 1.

The highest peaks of the proposed Phase 1 building reach up to 34’-0” high (with parapets). During the construction of Phase 1, the Applicant purchased the remaining 6.461 acre site to develop an additional 102 units of senior living for independent senior living. The intention of the proposed project is to create a mini congregate care campus for seniors to allow them to age in place. Construction of Phase 2 is expected to commence in October 2019 and last through March 2021.

Phase 2 will include construction of one new 103,004 square foot three-story building and will include 102 residential units. The proposed senior living community will include a variety of resident activity and support spaces such as a lobby with reception and administrative offices, a lounge, sports bar/bistro area, media/theater room, game room, as well as a main dining, a display kitchen, laundry, offices and fitness and activity space on the first floor. Outdoor amenities include pool, spa, bocce ball court, putting green and fitness area. Phase 2 of the project is shown on Figure 4.

Phase 2 will include 103 parking stalls including 95 standard spaces, 4 accessible access spaces, 1 van accessible space, and 3 electrical vehicle parking spaces. Anticipated covered spaces will be considered for solar panels (electrical) or solar ready roof. Landscape coverage for Phase II is 20 percent (or 31,136 square feet).

Both of the proposed buildings will be constructed as California Building Code Type VA, and will be fully sprinklered per National Fire Protection Association 13. Occupancy classification will be mixed use predominately Residential Group R-2.1, with associated Assembly Group A-2, A-3 & Business (B) as well as accessory uses Low Hazard Storage (S-2), Utility (U) and Miscellaneous.

The proposed senior care building design will feature a contemporary design that will include stucco wall and brick accent coverings, wood shutters, terra-cotta roofing tiles, gable roof designs, and deviating wall planes for articulation. The use of articulated building massing, select materials and details are proposed to create a residential campus design that would retain the essence of the residential land use within the area, while creating an architectural transition between existing residential and the institutional church buildings within the immediate area. Although the highest peaks of the proposed Phase 2 building reach up to 46 feet and 6 inches high (with parapets), the vast majority of the building will be 38 feet in height. Renderings of the proposed project are shown on Figure 5 and proposed building elevations are presented on Figures 6 through 9. The roof plan is shown on Figures 10 and 11 and Phase 1 and Phase 2 landscape plans are shown on Figures 12 and 13.

Grading activities associated with Phase 2 will result in approximately 2,562 cubic yards (CY) of cut and 2,502 CY of fill. Approximately 60 CY of soil will be exported offsite.

The proposed project would have 40 full time employees which would be divided among three eight-hour shifts as follows:
Shift #1: 7:00 AM – 3:00 PM, 20 staff members
Shift #2: 3PM – 11 PM, 16 staff members
Shift #3: 11 PM – 7 AM, 4 staff members

The site has an existing General Plan Land Use designation of General Commercial and is currently zoned as Limited Commercial District (CL) the proposed senior housing use is permitted with issuance of a conditional use permit as outlined in the City of Oceanside Zoning Ordinance per Article 1120 for Residential Care -

General Land Use. The Project site is not located within the Coastal Zone and is therefore not subject to the City's Local Coastal Program.

9. SURROUNDING LAND USE(S) & PROJECT SETTING

The southern 3.533 acres of the project site is currently developed with the Protea Assisted Living Facility (Phase 1) of the proposed project. The northern 2.928 acres are currently vacant. The site topography gently slopes from the north-northeast to the south-southwest with approximately 20 feet of relief from north to south. Elevations range from 397 Mean Sea Level (MSL) in the northeastern corner of the site; to 375 MSL at the southern corner of the site.

Surrounding land uses include single family residential units to the north, northeast, south and southeast, and a church and a charter school to the west.

10. OTHER REQUIRED AGENCY APPROVALS

No other agency approvals are required.

11. PREVIOUS ENVIRONMENTAL DOCUMENTATION

A Notice of Exemption was filed for Phase 1 of the project per Section 15332 of the California Environmental Quality Act.

12. CONSULTATION

A. Federal, State, and Other Local Agencies Consulted:

The City consulted the California Native American Heritage Commission (NAHC) and the Tribes on the list provided by the NAHC under the requirements of AB 52.

13. SUMMARY OF ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

This IS/MNDS evaluates the proposed project's potential effects on the following resource topics:

- ☒ Aesthetics
- ☒ Agriculture and forestry resources
- ☒ Air quality
- ☒ Biological resources
- ☒ Cultural resources/Tribal cultural resources
- ☒ Geology and soils
- ☒ Greenhouse gas emissions
- ☒ Hazards and hazardous materials
- ☒ Hydrology and water quality
- ☒ Land use and planning
- ☒ Mineral resources
- ☒ Noise
- ☒ Population and housing
- ☒ Public services
- ☒ Recreation
- ☒ Transportation/traffic
- ☒ Utilities and service systems
- ☒ Mandatory findings of significance

Figure 1. Regional Location

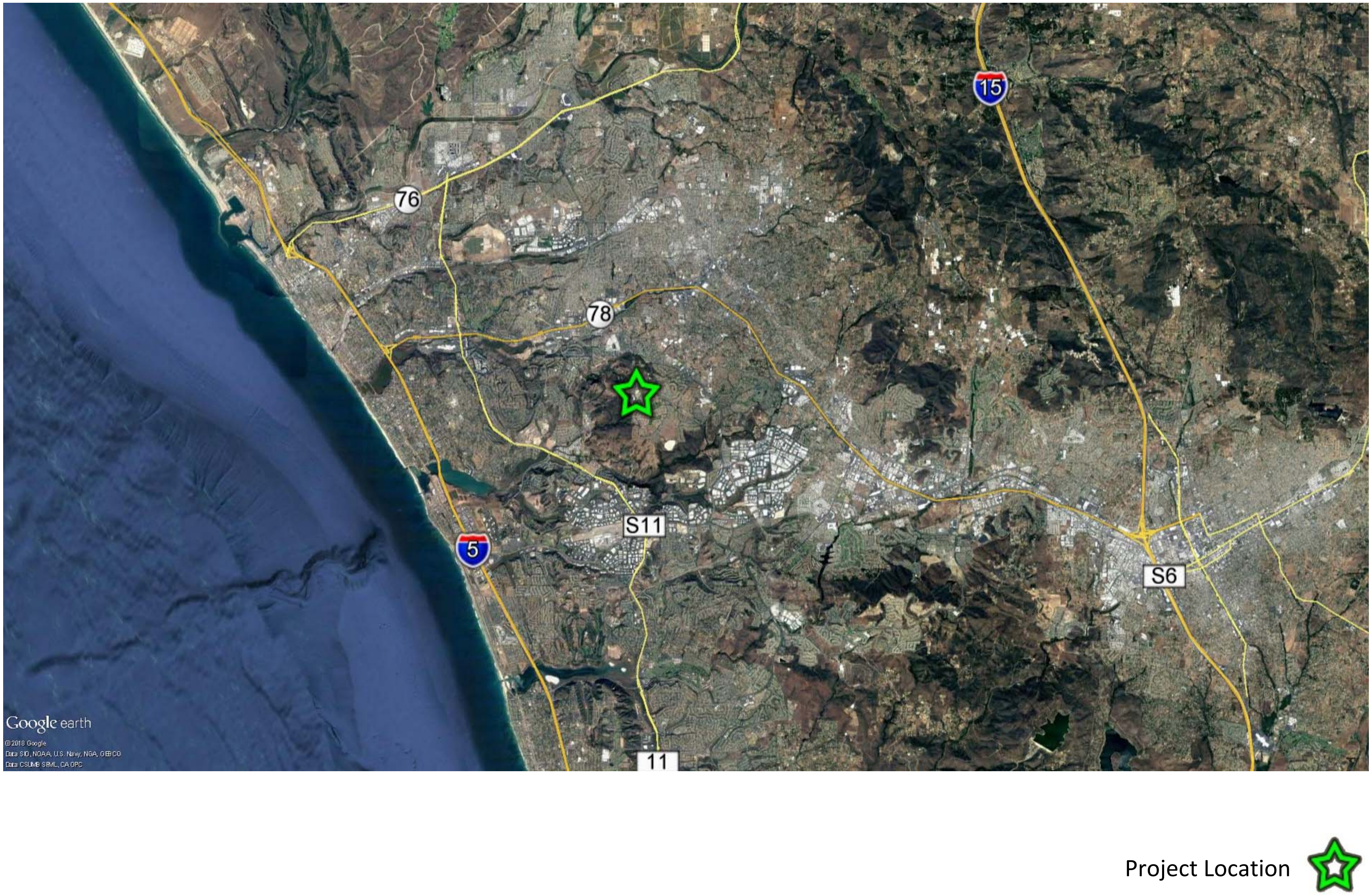


Figure 2 Proposed Site Plan

Figure 2. Site Vicinity

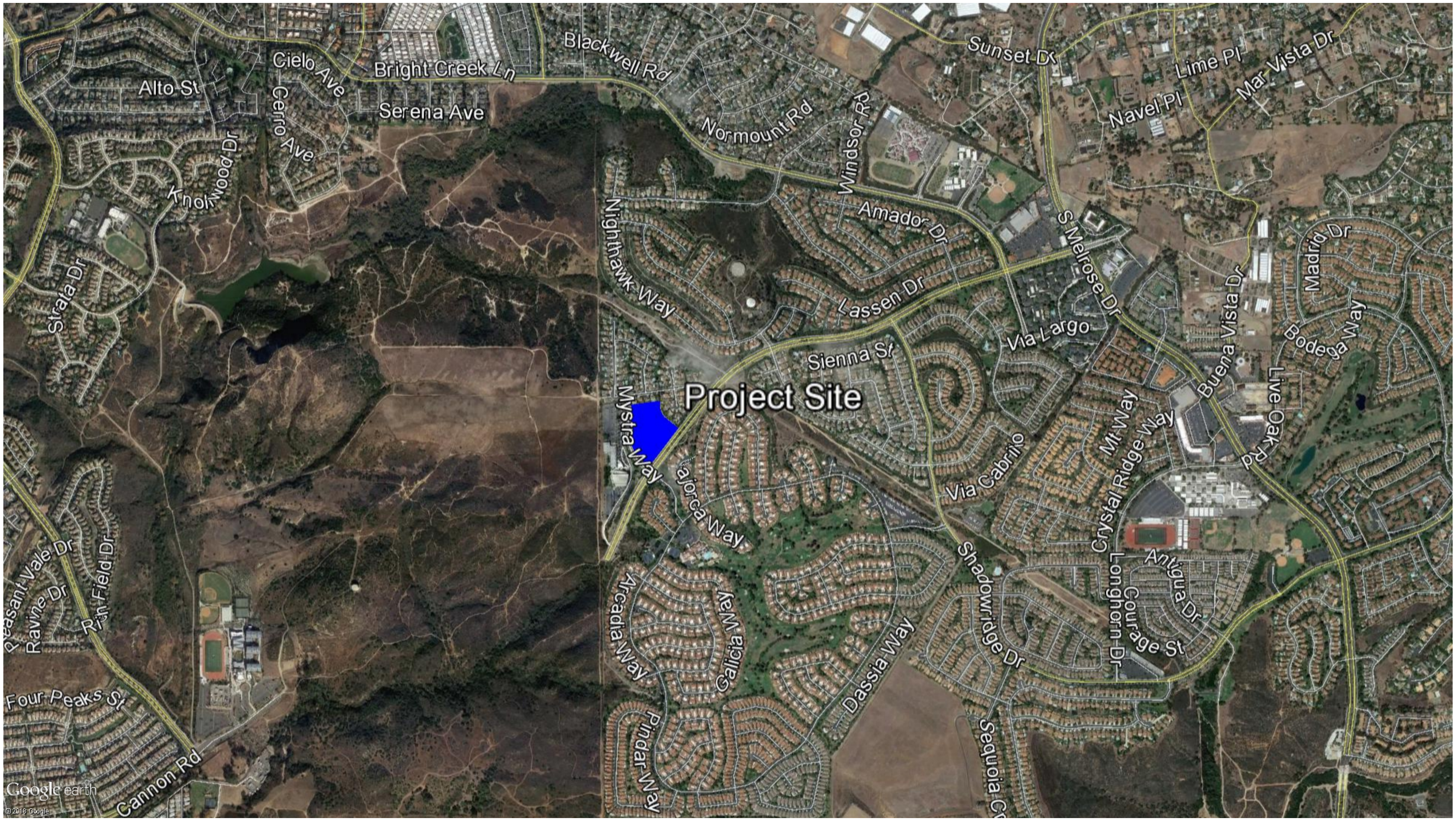


Figure 3. Site Plan

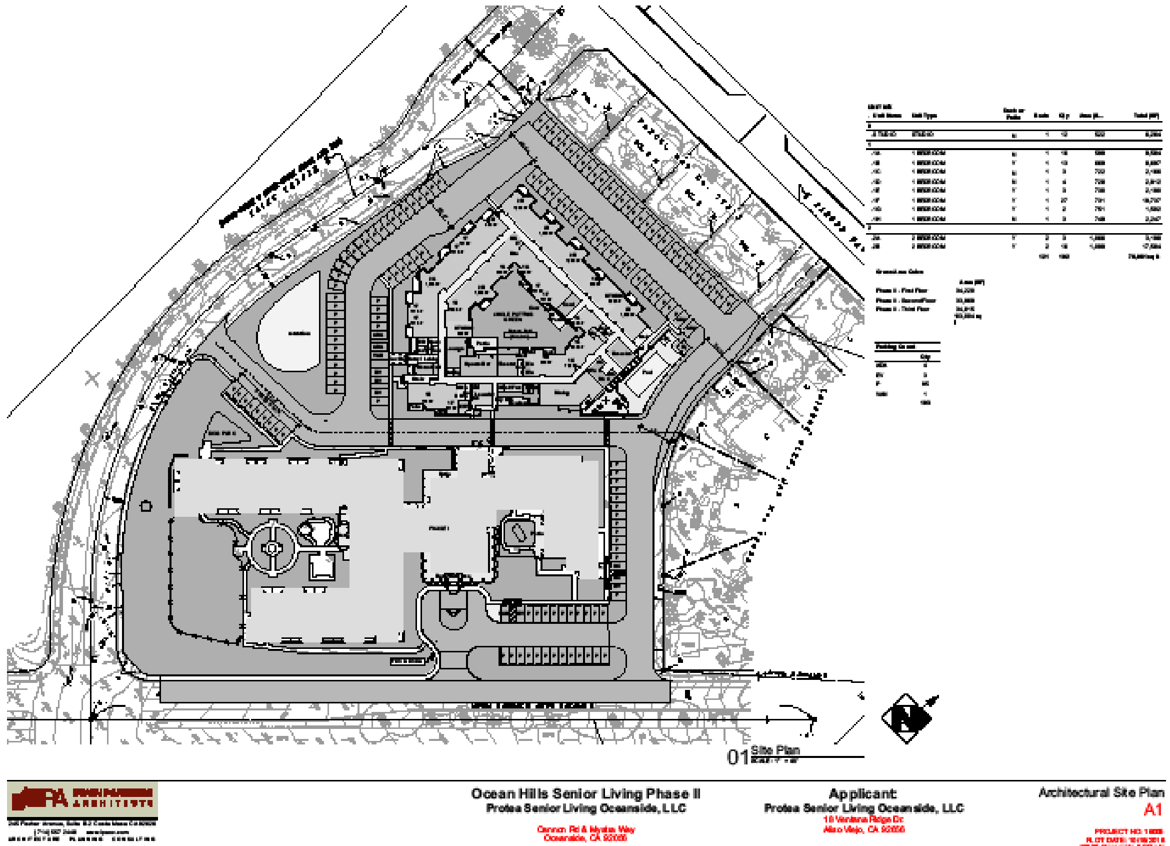


Figure 4. Site Plan – Phase 1 (Constructed)

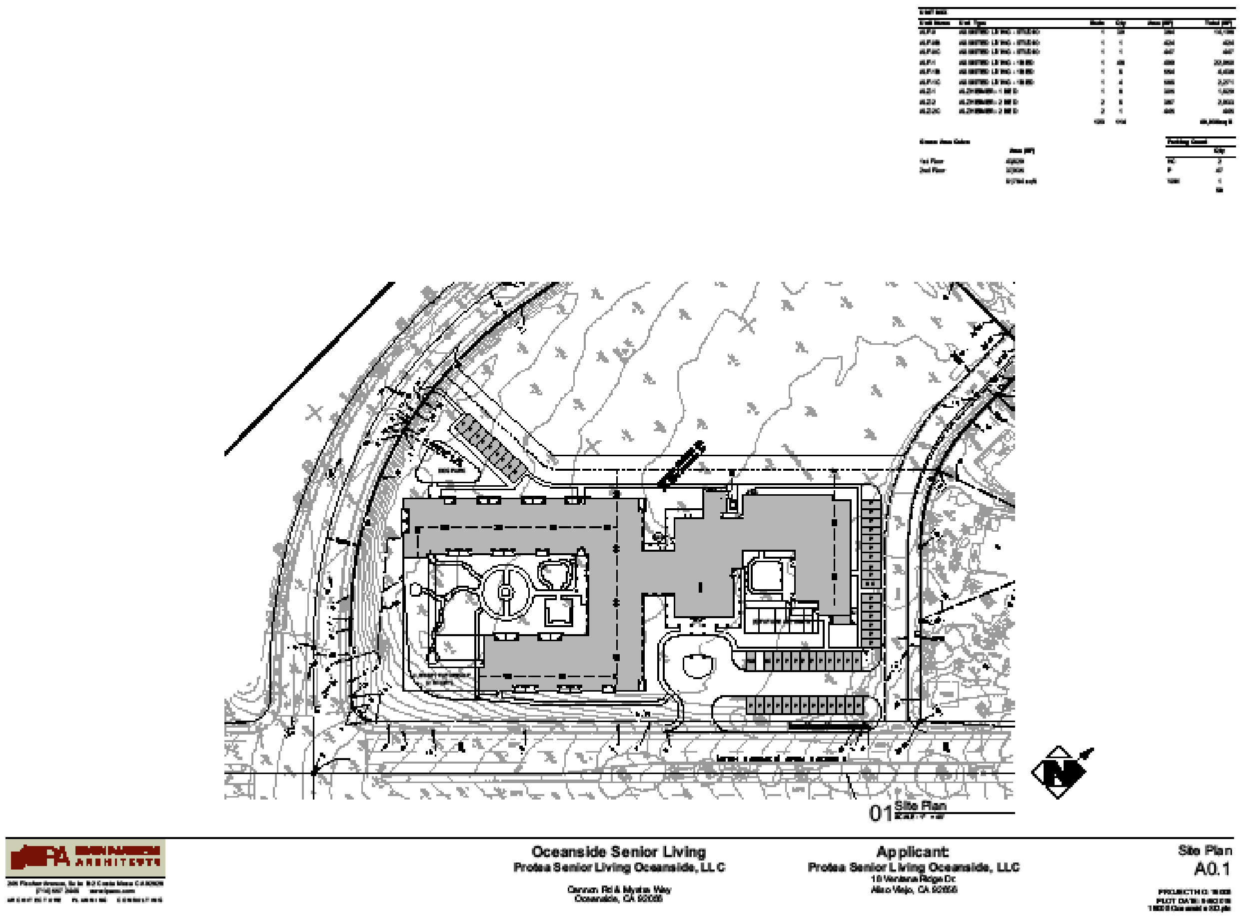


Figure 5. Proposed Site Plan – Phase 2

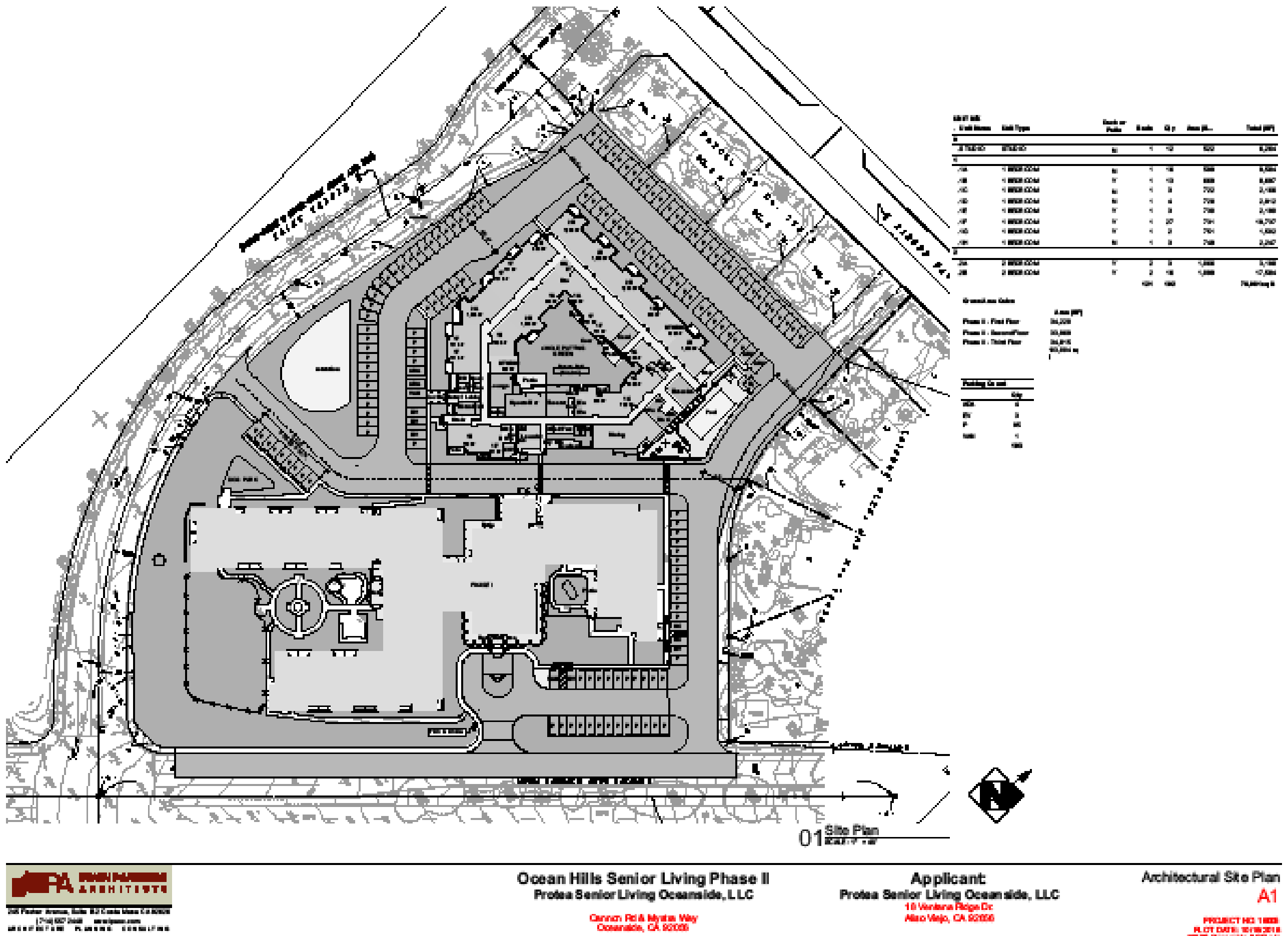


Figure 6. Project Renderings

Ocean Hills Senior Living Phase II - Aerial from North

Ocean Hills Senior Living Phase II - Aerial from the West

Ocean Hills Senior Living Phase II - Eye Level from Mystra Way Entry

Ocean Hills Senior Living Phase II - Eye Level from Cannon Road Entry

Ocean Hills Senior Living Phase II - Eye Level from North/East

IPA IRWIN PARTNERS ARCHITECTS
245 Fischer Avenue, Suite B-2 Costa Mesa CA 92626
(714) 557 2448 www.ipaoc.com
ARCHITECTURE PLANNING CONSULTING

City of Oceanside
Project File Numbers:
CUP16-00010 (Modification)

Ocean Hills Senior Living Phase II
Protea Senior Living Oceanside, LLC
4500 Cannon Rd & Mystra Way
Oceanside, CA 92056

Applicant:
Protea Senior Living Oceanside, LLC
18 Ventana Ridge Dr.
Aliso Viejo, CA 92656

Project Renderings
A10
PROJECT NO: 18009
PLOT DATE: 2/4/2019
18009 Oceanside II SD.pln

Figure 7. Building Elevations- Phase 1 (Constructed), South and West

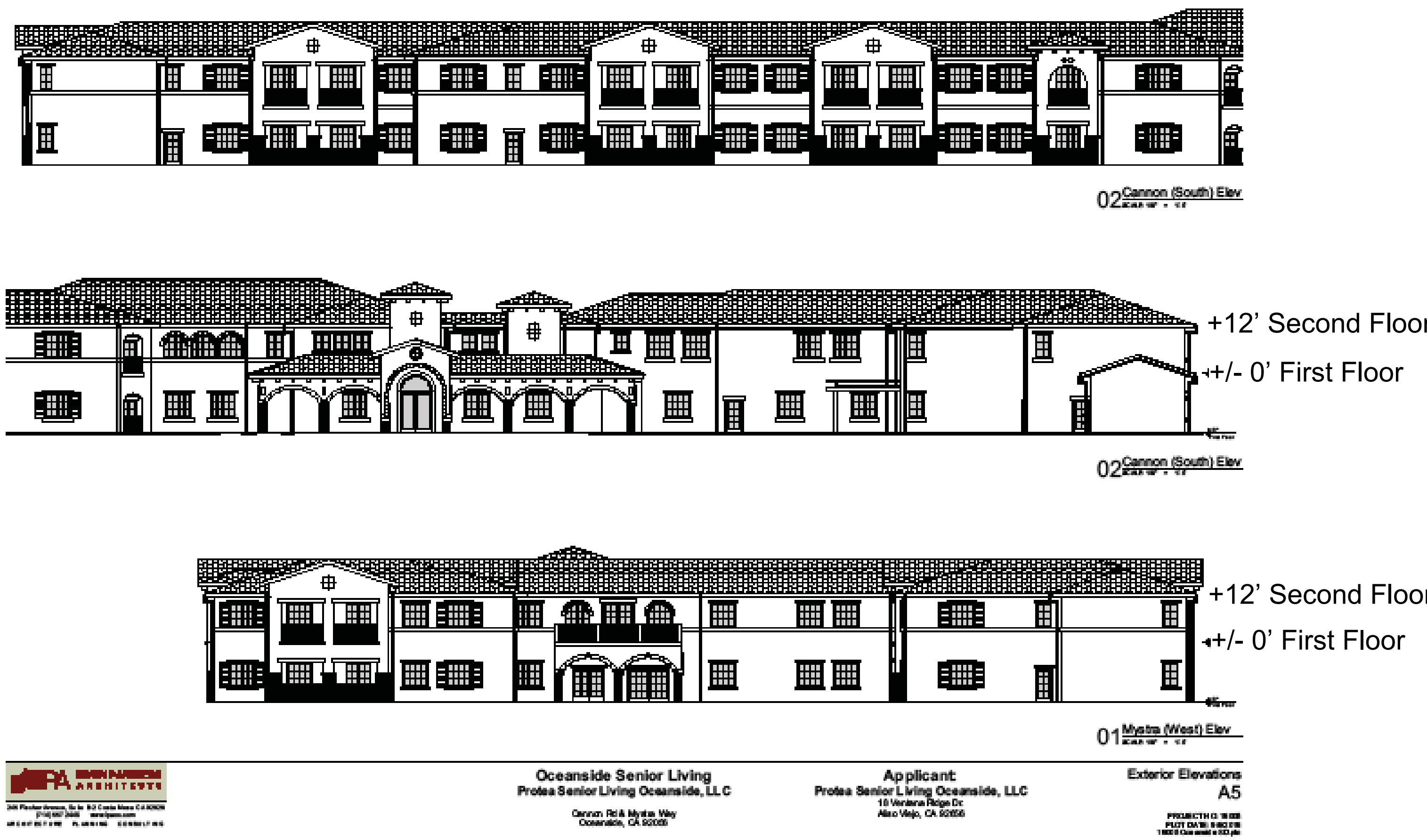


Figure 8. Building Elevations – Phase 1 (Constructed), North and East

Figure 9. Proposed Building Elevations – Phase 2, Northwest and West

Figure 10. Proposed Building Elevations – Phase 2, South, Southeast and Northeast

Figure 11. Roof Plan – Phase 1 (Constructed)

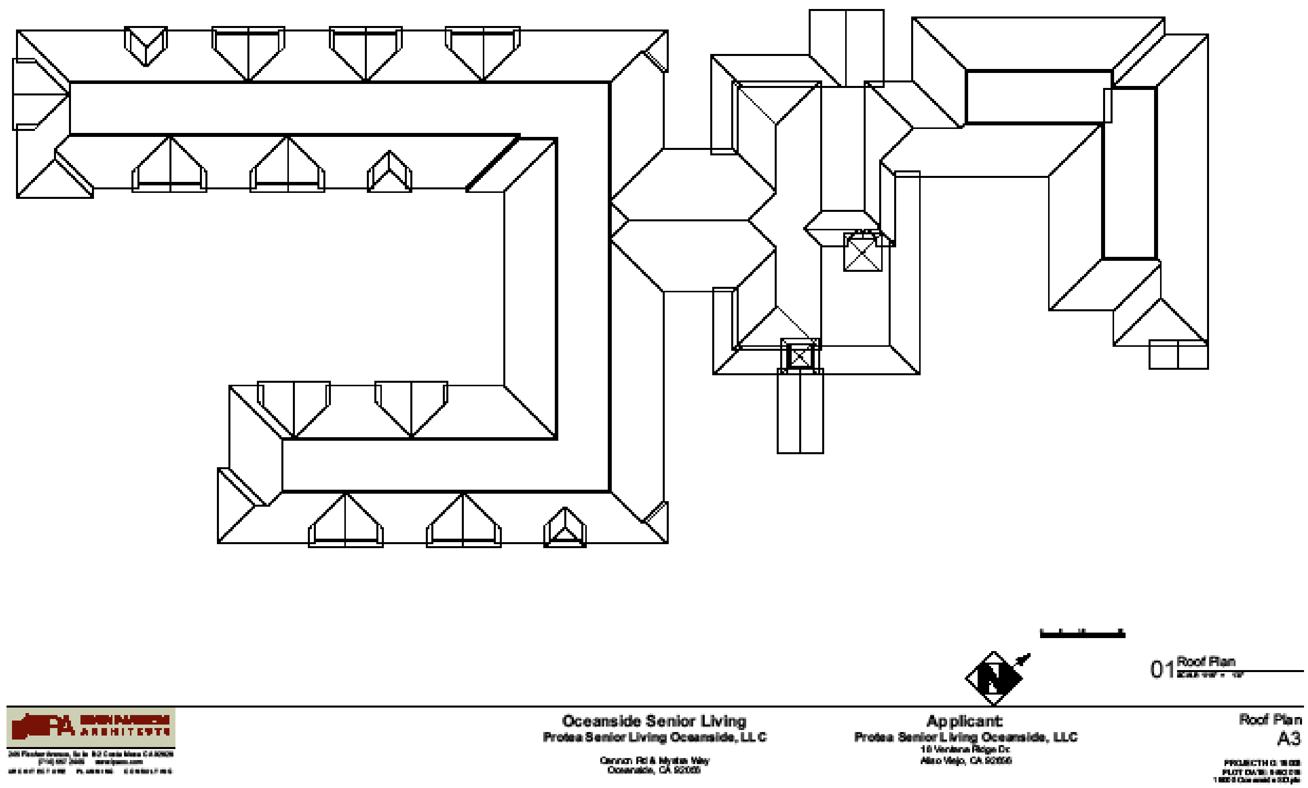


Figure 12. Roof Plan – Phase 2 (Proposed)

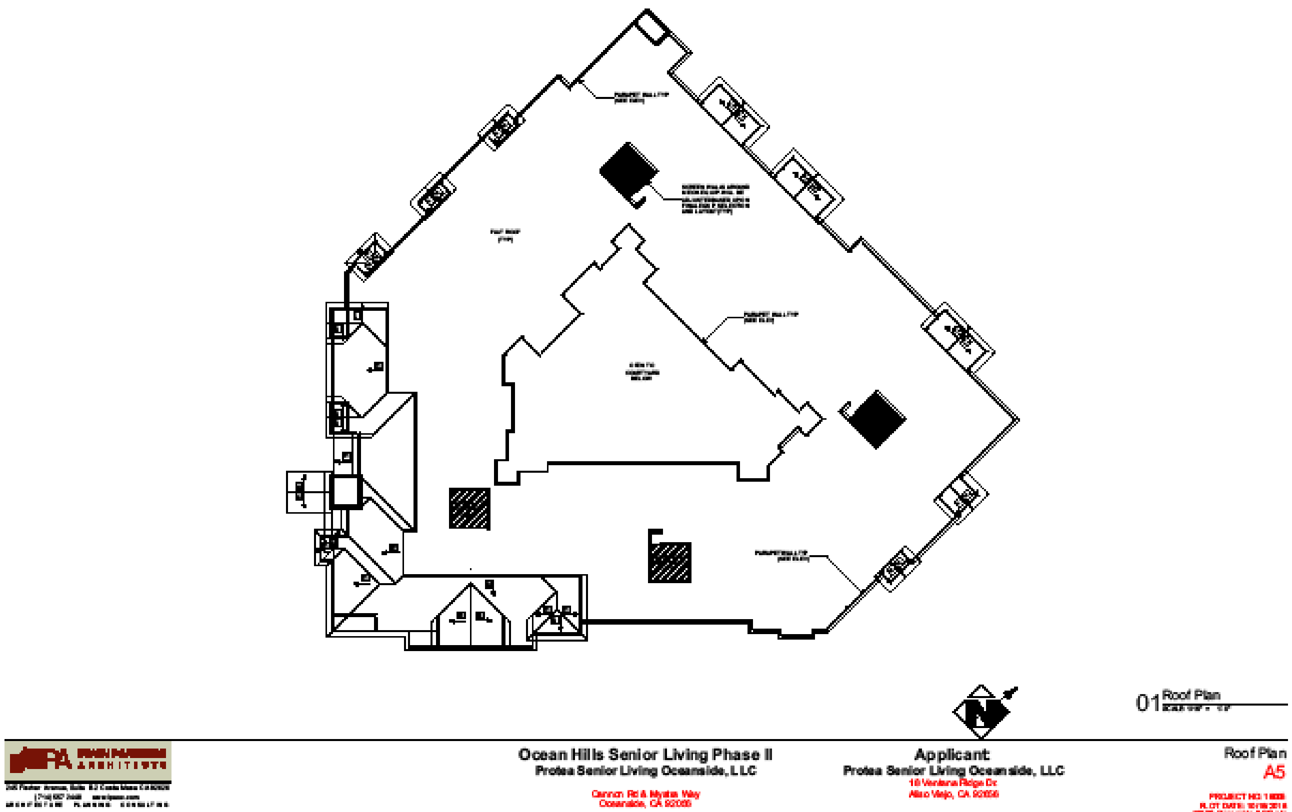


Figure 13. Landscape Plan – Phase 1 (Existing)

Figure 14. Landscape Plan – Phase 2 (Proposed)

14. ENVIRONMENTAL CHECKLIST

This section analyzes the potential environmental impacts which may result from the proposed project. For the evaluation of potential impacts, the questions in the IS Checklist (Section 2) are stated and answers are provided according to the analysis undertaken as part of the IS. The analysis considers the project's short-term impacts (construction-related), and its operational or day-to-day impacts. For each question, there are four possible responses. They include:

No Impact. Future development arising from the project's implementation will not have any measurable environmental impact on the environment and no additional analysis is required.

Less Than Significant Impact. The development associated with project implementation will have the potential to impact the environment; these impacts, however, will be less than the levels or thresholds that are considered significant and no additional analysis is required.

Potentially Significant Unless Mitigated. The development will have the potential to generate impacts which may be considered as a significant effect on the environment, although mitigation measures or changes to the project's physical or operational characteristics can reduce these impacts to levels that are less than significant.

Potentially Significant Impact. Future implementation will have impacts that are considered significant, and additional analysis is required to identify mitigation measures that could reduce these impacts to less than significant levels.

14.1 AESTHETICS Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b. Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic building along a State-designated scenic highway?	☐	☐	☐	☒
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐

d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

Impact Discussion

a) Have a substantial adverse effect on a scenic vista?

No Impact. Based on a review of the City's General Plan (City of Oceanside 1974), there are no designated scenic vistas in the vicinity of the project site. While the proposed project would alter the visual character of the project site (refer to Figures 3 -13 and Threshold c below), no significant impacts to scenic vistas would result from the project. No mitigation is required.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. No scenic resources, including trees, rock outcroppings or historic buildings are situated on-site. In addition, the project site is not situated within a state scenic highway. Impacts are not anticipated in this regard. No mitigation is required.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Less Than Significant Impact. Refer to Responses 14.1.a and 14.1.b, above. The building design would feature a contemporary design that would include stucco wall and brick accent coverings, wood shutters, terra-cotta roofing tiles, gable roof designs, and deviating wall planes for articulation. The use of articulated building massing, select materials and details are proposed to create a residential campus design that would retain the essence of the residential land use within the area, while creating an architectural transition between existing residential and the institutional church buildings within the immediate area.

While the proposed project would alter the existing visual character of the project site and views from surrounding vantage points, this change would not be considered a substantial degradation of the project site or its surroundings.

During construction activities at the project site, there would be views of construction equipment; ongoing construction activities; additional construction signage and warning markers on roadways; short-term stockpiles of building materials and debris; and haul trucks to deliver building materials and to remove debris. The visual change during construction would be less than significant because of its temporary nature and because the views would be typical of construction sites in an urban environment.

The proposed project is consistent with the City of Oceanside General Plan Policy regarding scenic resources encourages the preservation of significant visual open spaces when such preservation is in the best interest of the public health, safety, and welfare. The project site is not identified in the City of Oceanside General Plan as a scenic resource or significant visual open space nor does the site does not contain any scenic resources or allow views to any scenic resources. The southern portion of the site is currently developed with Phase 1 of the project and the northern portion of the site is currently vacant, with scattered litter almost no vegetation. Scenic vistas, and public views will not be substantially altered by the development of the proposed project. Views of the site from Mystra Way and Cannon Road will change from a partially vacant lot to a fully developed lot. The site will be landscaped in accordance with City of Oceanside standards and will enhance the overall appearance of the site. The project would not substantially degrade the existing visual character or quality of the project site or its surroundings. This impact is not significant. No mitigation is required.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less Than Significant Impact. Due to the developed and urban nature of the project site and surrounding area, there is existing ambient light. The project site is located within an area developed with parking lots, school uses, church uses, and residential development. Existing sources of light include street lights and vehicle headlights; interior and exterior lighting from existing buildings on the surrounding properties; multiple light poles providing nighttime lighting along Cannon Road and Mystra Drive and multiple light poles in the existing parking lot associated with the church and school located west of the project site, on the west side of Mystra Drive.

Consistent with existing conditions in the vicinity of the project, the proposed project would generate light at levels sufficient for safety and visibility. The site access driveways would provide lighting sufficient to ensure safety for pedestrian crossing and visibility for vehicles using the driveways. All proposed lighting would be designed in accordance with City of Oceanside Municipal Code, Chapter 39, Light Pollution Regulations, which require that all lighting employ shielded luminaries with glare control to prevent light spillover, as appropriate, to the surrounding uses. These regulations are intended to prevent detrimental effects related to light pollution as well as impacts to the Palomar Observatory located approximately 26.8 miles northeast of the project site. Therefore, the lighting associated with the proposed project would not adversely affect any existing land uses, including single family residential uses to the north, northeast, south and southeast, and the church and charter school to the west.

Potentially reflective surfaces in the project vicinity include windows (including automobile and truck windows) at the project site and adjacent buildings, and on automobiles traveling and parked on streets in the project site vicinity. Based on the proposed building materials, the project would incorporate non-reflective textured surfaces and non-reflective glass, which would minimize the potential for glare. The proposed project does not include any uses that would have the potential to create noticeable glare from sunlight or vehicle lights that would pose a hazard to motorists traveling in the project area or that could affect surrounding uses. Impacts would be less than significant. No mitigation is required.

Impact Summary

Impacts related to Aesthetics would be less than significant. No mitigation measures are required.

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

Impact Discussion

a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use?

No Impact. Based on latest farmland mapping published by the California Department of Conservation, the project site is designated in the Farmland Mapping and Monitoring Program as Urban and Built-Up Land (Department of Conservation 2019). No portion of the project site is located on land designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Designated land uses in the project area do not include agricultural uses, and project implementation would not result in conversion of existing farmland to non-agricultural uses. Therefore, the project does not affect an agricultural resource area, and thus does not impact designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. No mitigation is required.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The proposed project site is currently zoned (CL), Limited Commercial District, on the City's zoning map. Agricultural designations and Williamson Act contracts do not occur on the project site or in surrounding areas. Therefore, implementation of the proposed project would not result in any conflicts with existing zoning for agricultural use or a Williamson Act Contract. No impact would occur. No mitigation is required.

c) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No Impact. There are no areas zoned for forest land or timberland in the City, and no such resources exist in the City. Therefore, implementation of the proposed project would not conflict with existing zoning, nor would it cause rezoning of forest land, timberland, or timberland zoned Timberland Production. No impact would occur. No mitigation is required.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. The project site is a previously developed but currently vacant infill lot and does not support forest land. There are no forest lands on the project site or in the surrounding area. Therefore, development of the proposed project would not result in a loss or conversion of forest land to non-forest use. No impact would occur. No mitigation is required.

e) Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

No Impact. There are no agricultural or forest lands in the vicinity of the project site. Thus, implementation of this project would not result in changes in the environment that would result in the conversion of farmland to non-agricultural use. No impact would occur. No mitigation is required.

Impact Summary

The proposed project would not result in impacts related to Agricultural or Forestry Resources. No mitigation measures are required.

14.3 AIR QUALITY Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b. Violate an air quality standard or contribute to an existing or projected air quality violation?	☐	☐	☒	☐
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under the applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e. Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

The discussion below is summarized and based on the findings contained within the Air Quality and Greenhouse Gases Memorandum Report prepared for the Proposed Project (Roma Environmental 2019a). This Memorandum is included in this IS/MND as Appendix A.

__Impact Discussion__

a) Conflict with or obstruct implementation of the applicable air quality plan?

Less Than Significant Impact. The project site is located in the San Diego Air Basin (SDAB) and, for air quality regulation and permitting, is under the jurisdiction of the San Diego County Air Pollution Control District (SDAPCD). The SDAPCD is the local agency responsible for the administration and enforcement of air quality regulations for the SDAB. The SDAPCD regulates most air pollutant sources, except for motor vehicles, marine vessels, aircraft and agricultural equipment, which are regulated by the California Air Resources Board (CARB) or U.S. Environmental Protection Agency (USEPA). State and local government projects, as well as projects proposed by the private sector, are subject to SDAPCD requirements if the sources are regulated by the SDAPCD. Additionally, the SDAPCD, along with CARB, maintains and operates ambient air quality monitoring stations at numerous locations throughout San Diego County. These stations are used to measure and monitor ambient criteria air pollutant levels. Both the State of California and the USEPA have established health-based Ambient Air Quality Standards (AAQS) for air pollutants, which are known as “criteria pollutants”. The AAQS are designed to protect the health and welfare of the populace within a reasonable margin of safety.

The San Diego Association of Governments (SANDAG) is the San Diego region’s primary public planning, transportation and research agency, providing the public forum for regional policy decisions about growth, transportation planning and construction, environmental management, housing, open space, energy, public safety, and binational topics. The SDAPCD and SANDAG are responsible for developing and implementing the clean air plans for attainment and maintenance of AAQS in the SDAB.

The applicable air quality plan is the Regional Air Quality Strategy (RAQS) prepared by the SDAPCD. The RAQS was developed to identify feasible emission control measures and provide expeditious progress toward attaining the State ozone (O3) standards (SDAPCD 2009a). The RAQS relies on information from CARB and SANDAG, including mobile and area source emissions, as well as information regarding projected growth in the County of San Diego to forecast future emissions and then determine the strategies necessary for the reduction of emissions through regulatory controls. The CARB mobile source emissions projections and the SANDAG growth projections are based on population and vehicle use trends, local general plans, local coastal programs, and other applicable land use plans. Consistency with the RAQS is determined by two standards: (1) whether the proposed project would exceed assumptions contained in the RAQS; and (2) whether a project would increase the frequency or severity of violations of existing air quality standards, contribute to new violations, or delay the timely attainment of air quality standards or interim reductions as contained in the RAQS.

The site has an existing General Plan (City of Oceanside 1989) Land Use designation of General Commercial and is currently zoned as Limited Commercial District (CL). Phase 2 of the proposed project includes the construction and operation of a new 103,004 square foot three-story building and will include 102 residential dwelling units with 121 beds. The proposed project’s use, density, and intensity are consistent with the General Plan Land Use Element’s designation for the project site. The project would not result in population growth not accounted for in the City of Oceanside and SANDAG planning documents, and thus is considered to be within the City and SANDAG growth projections. In addition, as discussed in Response 14.3.b), construction and operational emissions would not exceed the SDAPCD thresholds. As a result, the project would not result in violations or affect air quality attainment status in the SDAPCD. Therefore, the project is consistent with the RAQS. A less than significant impact would occur, and no mitigation is required.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Less Than Significant Impact. The project would result in construction and operational emissions, evaluated below. For CEQA purposes, SDAPCD screening-level thresholds are used to demonstrate that a project’s emissions would not result in a significant impact to air quality.

Construction Emissions

Construction-related activities are temporary, short-term sources of air emissions. Sources of construction-related air emissions include:

- Fugitive dust from grading activities;
- Construction equipment exhaust;
- Construction-related trips by workers, delivery trucks, and material-hauling trucks; and
- Construction-related power consumption.

Fugitive dust emissions vary greatly during construction and are dependent on the amount and type of activity, silt content of the soil, and the weather. Vehicles moving over paved and unpaved surfaces, demolition, excavation, earth movement, grading, and wind erosion from exposed surfaces can all be sources of fugitive dust. Construction operations are subject to the requirements established in SDAPCD Regulation 4, Rules 52, 54, and 55.

An analysis of the potential short-term air quality impacts due the construction of Phase 2 of the proposed convalescent care center is provided. Construction of Phase 2 is expected to commence no sooner than October 2019 and last through approximately March 2021. Grading activities associated with Phase 2 will result in approximately 2,562 CY of cut and 2,502 CY of fill. Approximately 60 CY of soil will be exported offsite. Fine grading and infrastructure installation is anticipated to occur first and take approximately 60 days. Phases analyzed include: 1) fine grading, 2) building construction, 3) architectural coating, and 4) paving.

The construction-related criteria pollutant emissions for the construction of the proposed Phase 2-portion of the convalescent care center are shown below in Table 1.

Table 1 Construction-Related Pollutant Emissions

	Pollutant Emissions (pounds/day)					
Activity	**VOC**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
Fine Grading						
On-Site[2]	2.03	22.74	10.15	0.02	7.63	4.35
Off-Site[3]	0.04	0.07	0.32	0.00	0.09	0.02
Total	2.07	22.81	10.47	0.02	7.71	4.38
Building Construction						
On-Site[2]	2.56	18.91	15.25	0.03	1.09	0.04
Off-Site[3]	0.44	2.48	3.39	0.01	0.89	0.25
Total	3.00	21.39	18.65	0.04	1.98	0.30
Paving						
On-Site[2]	1.24	11.59	11.81	0.02	0.66	0.61
Off-Site[3]	0.06	0.04	0.43	0.00	0.12	0.03
Total	1.29	11.62	12.23	0.02	0.78	0.64
Architectural Coating						

On-Site[2]	65.63	1.53	1.82	0.00	0.09	0.09
Off-Site[3]	0.06	0.04	0.48	0.00	0.15	0.04
Total	65.69	1.57	2.30	0.00	0.24	0.13
Total (Overlapping Phases)	69.98	34.58	33.17	0.06	3.00	1.07
SDAPCD Thresholds	75	250	550	250	100	55
Exceeds Thresholds?	**no**	**no**	**no**	**no**	**no**	**no**

[1] Source: CalEEMod 2016.3.2

[2] On-site emissions from equipment operated on-site that is not operated on public roads.

[3] Off-site emissions from equipment operated on public roads.

[4] Construction, architectural coatings, and paving phases may overlap.

Standard dust control measures would be implemented as a part of project construction in accordance with SDAPCD rules and regulations. Fugitive dust emissions were calculated using CalEEMod default values, and did not take into account the required dust control measures. Thus, the emissions shown above in Table 1 are conservative. Table 1 shows that none of the analyzed criteria pollutants would exceed the SDAPCD screening-level thresholds. Therefore, a less than significant air quality impact would occur from construction of the project. No mitigation is required.

Long-Term Operational Emissions

Long-term air quality impacts consist of mobile source emissions generated from project-related traffic and stationary source emissions (generated directly from on-site activities and from the electricity and natural gas consumed). Operational emissions would result from visitors and worker commuting vehicles, as well as area sources, electricity consumption, natural gas combustion, water usage and wastewater discharge, and solid waste disposal required for operating the proposed project.

The vehicle trips associated with the proposed project were based on the weekday and Sunday trip generation rates identified in the November 2018, Rick Engineering Company, Ocean Hills Senior Living Phase 2 Facility Focused Traffic Impact Study (TIA). Trip generation rates for Saturday were obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual 10th Edition (2017) for land use ITE 255: Continuing Care Retirement Community. The TIA analyzed Phase 1 as 114 dwelling units (DU) with 123 beds and Phase 2 as 101 DU with 118 beds; however, per the Irwin Partners Architects (IPA) site plan for Phase 2 dated 10/18/2018, Phase 2 includes 102 DU with 121 beds. The trip generation rates in the TIA used the SANDAG Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002 for the weekday rates (per bed) and the Trip Generation Manual 10th Edition for land use ITE 255: Continuing Care Retirement Community for the Sunday rates (per DU).

The CalEEMod model only has the option to select DUs for the land use ITE 255 Retirement Community, so the weekday trips/bed rate was converted to trips/DU. For Phase 1, this yielded a trip generation rate of 3.237 trips/DU on weekdays, 2.09 trips/DU on Saturdays and 2 trips/DU on Sundays. For Phase 2, to be conservative and ensure the analysis of the worst-case scenario, the higher number of 102 DU and 121 beds was used. Using the slightly higher values, the trip generation rate for Phase 2 weekdays calculated out to 3.559 trips/DU, 2.09 trips/DU for Saturday and 2 trips/DU for Sunday.

Area sources include emissions from hearths, consumer products, landscape equipment and architectural coatings. To be conservative, paints for the residential uses were limited to 150 grams/liter (g/L) volatile organic compound (VOC) content (maximum allowable VOC content for non-flat, high-gloss coatings per SDAPCD Rule 67.0.1).

Energy usage includes emissions from the generation of electricity and natural gas used on-site. Project design features include solar panels on covered parking and a solar-ready roof.

An analysis of the potential long-term air quality impacts due to operations of the entire Project (Phase 1 [existing] and Phase 2) has been completed. The operations-related criteria air quality impacts created by Phase 1 (already operational) and Phase 2 of the proposed project have been analyzed through use of the CalEEMod model. The operating emissions for Phase 1 were based on the year 2019 and year 2021 for Phase 2 (the anticipated opening year for Phase 2 of the proposed project). The worst-case summer or winter VOC, NOx, CO, SO2, PM10, and PM2.5 emissions generated by both (existing) Phase 1 and Phase 2 of the project's long-term operations have been calculated and are summarized below in Tables 2 and 3. The combined operational emissions from both Phase 1 and Phase 2 is shown in Table 4.

Table 2 Operational Pollutant Emissions from Phase 1 (Existing)

Phase I	**Pollutant Emissions (pounds/day)**					
Activity	**VOC**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
Area Sources[2]	2.47	0.11	9.46	0.00	0.05	0.05
Energy Usage[3]	0.04	0.32	0.14	0.00	0.03	0.03
Mobile Sources[4]	0.77	3.26	9.00	0.03	2.27	0.63
Total Emissions	3.28	3.69	18.59	0.03	2.35	0.70
SDAPCD Thresholds	75	250	550	250	100	55
Exceeds Thresholds?	**no**	**no**	**no**	**no**	**no**	**no**

Table 3 Operational Pollutant Emissions from Phase 2 (Proposed)

Phase II	**Pollutant Emissions (pounds/day)**					
Activity	**VOC**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
Area Sources[2]	3.01	0.10	8.44	0.00	0.05	0.05
Energy Usage[3]	0.03	0.29	0.12	0.00	0.02	0.02
Mobile Sources[4]	0.64	2.71	7.61	0.03	2.22	0.61
Total Emissions	3.69	3.09	16.18	0.03	2.29	0.68
SDAPCD Thresholds	75	250	550	250	100	55
Exceeds Thresholds?	**no**	**no**	**no**	**no**	**no**	**no**

1 Source for Tables AQ-2 and AQ-3: CalEEMod Version 2016.3.2.

2 Area sources consist of emissions from consumer products, architectural coatings, hearths and landscaping equipment.

3 Energy usage consists of emissions from generation of electricity and on-site non-hearth natural gas usage.

4 Mobile sources consist of emissions from vehicles and road dust.

Table 4 Operational Pollutant Emissions from Phase 1 & 2 Combined

Phase I Plus Phase II	Pollutant Emissions (pounds/day)					
Activity	**VOC**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
Phase I and II Total Emissions	6.97	6.78	34.77	0.06	4.64	1.38
SDAPCD Thresholds	75	250	550	250	100	55
Exceeds Thresholds?	**no**	**no**	**no**	**no**	**no**	**no**

Tables 2 and 3 show that none of the analyzed criteria pollutants would exceed the established screening-level emissions thresholds for Phase 1 or Phase 2. Table 4 shows that even when Phases 1 and 2 are combined, no screening-level emissions thresholds are exceeded either. Therefore, a less than significant air quality impact would occur from operation of the proposed project.

As presented in Tables 1 through 4, all air pollutant emissions would be below the significance thresholds for both construction and operation of the proposed project. Furthermore, construction of the proposed project would comply with SDAPCD's Rule 55, Fugitive Dust Control, which requires that construction activities implement specific measures to minimize fugitive dust emissions. The proposed project would also comply with SDAPCD's Rule 50 (Visible Emissions), Rule 51 (Nuisance), Rule 52 (Particulate Matter), and Rule 67.0.1 (Architectural Coatings). Therefore, air quality impacts would be less than significant. No mitigation is required.

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

Less Than Significant Impact. Cumulative air quality impacts may occur from a combination of the project's emissions with the emissions of other reasonably foreseeable projects and/or regional emissions. The project site is located in the SDAB and is regulated by the SDAPCD. San Diego County is currently in non-attainment for the 1-hour concentrations under the California Ambient Air Quality Standards (CAAQS) for O3, and for the 24-hour concentrations of Particulate Matter-10 (PM-10) under CAAQS. O3 is formed when reactive organic gases (ROG) and nitrogen oxides react in the presence of sunlight. ROG sources include any source that burns fuels, such as gasoline, natural gas, wood and oil. Sources of PM-10 include motor vehicles, wood burning stoves and fireplaces, dust from construction, landfills, agriculture, wildfires, brush and waste burning, industrial sources, and windblown dust from open lands.

SDAPCD has established air contaminant "trigger levels" which indicate scenarios that require additional review. These "trigger levels" include 100 pounds per day for PM-10, 250 pounds per day of Nitrogen Oxides (NOx) and 550 pounds per day of Carbon Monoxide (CO). As shown in Tables 1 and 2 through 4, construction and operation of the project would result in an increase in PM-10, NOx and CO, but not to a level above SDAPCD's "trigger levels." Therefore, the project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under applicable federal or state ambient air quality standards. Impacts would be less than significant. No mitigation is required.

d) Expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact. Sensitive receptors are populations that are more susceptible to the effects of air pollution than the population at large, such as the very young, the elderly, and those suffering from certain illnesses or disabilities. Surrounding land uses include single family dwellings to the north, northeast, south and southeast, and a church and a charter school to the west. The existing, operational Phase 1 portion is also directly to the southeast of the proposed Phase 2. Construction activities would be adjacent to residences to the north, northeast and to Phase 1 to the southeast. No stationary source of pollutant emissions would be generated by the project operations. Grading and construction of the project could generate fugitive dust emissions from construction and grading equipment. However, these emissions would not reach a level of significance, are temporary, and would not generate ongoing, substantial sources of emissions that could adversely affect surrounding sensitive receptors. Furthermore, construction of the proposed project would comply with SDAPCD’s Rule 55, Fugitive Dust Control, which requires that construction activities implement specific measures to minimize fugitive dust emissions. The proposed project would also comply with SDAPCD’s Rule 50 (Visible Emissions), Rule 51 (Nuisance), and Rule 52 (Particulate Matter).

Construction activities would also entail the use of diesel equipment that would generate emissions of diesel particulate matter (DPM), which the CARB has categorized as a human carcinogen. The use of diesel-powered construction equipment would be temporary and episodic. The duration of exposure would be short, and exhaust from construction equipment dissipates rapidly. Current models and methodologies for conducting health risk assessments are associated with a longer-term exposure periods of 30 years (OEHHA 2015), which does not correlate well with the temporary and highly variable nature of construction activities. Based on this timeframe, the 16-month construction, the exposure would be approximately 4 percent of the total exposure period used for health risk calculation. Due to the limited size of the project and the short duration of construction, DPM generated by project construction is not expected to create conditions where the probability is greater than 10 in 1 million of contracting cancer for the Maximally Exposed Individual, or to generate ground-level concentrations of non-carcinogenic toxic air contaminants that exceed a Hazard Index greater than 1 for the Maximally Exposed Individual. Furthermore, Project construction would be subject to and would comply with California regulations limiting the idling of heavy-duty construction equipment to no more than 5 minutes, which would further reduce nearby sensitive receptors’ exposure to temporary and variable diesel PM emissions. Therefore, impacts to sensitive receptors would be less than significant.

A CO hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically near intersections. CO hotspots have the potential to violate state and federal CO standards at intersections, even if the broader basin is in attainment for federal and state levels. The California Department of Transportation Project-Level Carbon Monoxide Protocol (Protocol) screening procedures have been utilized to determine if the project could potentially result in a CO hotspot (U.C. Davis Institute of Transportation Studies 1997). As indicated by the CO Protocol, CO hotspots occur nearly exclusively at signalized intersections operating at level of service (LOS) E or F. Accordingly, the CO Protocol recommends detailed air quality dispersion modeling for projects that may worsen traffic flow at any signalized intersections operating at LOS E or F.

As the project involves a retirement community, localized on-site operational emissions (e.g., area source emissions) would be nominal and would not affect nearby sensitive receptors. The primary project operational emissions would occur from vehicles. Per the TIA, the project would result in a maximum of approximately 723 daily trips. The SDAPCD requires a quantified assessment of CO hot spots for any project that would place receptors within 500 feet of a major intersection or roadway segment operating at or below LOS E. None of the intersections analyzed in the TIA would operate at an LOS less than B for the Existing Plus Buildout Scenario. Therefore, no CO hot spots are anticipated due to project-related traffic and a less than significant impact would occur. No mitigation is required.

e) Create objectionable odors affecting a substantial number of people?

Less Than Significant Impact. Diesel-fueled construction equipment exhaust would generate some odors. However, these emissions typically dissipate quickly and would be unlikely to affect a substantial number of people. Odor impacts could also result from siting a new sensitive receptor near an existing odor source. Examples of land uses that have the potential to generate considerable odors include, but are not limited to wastewater treatment plants; landfills; refineries; and chemical plants. Projects that would site a new receptor farther than the applicable screening distance from an existing odor source would not likely result in a significant odor impact. The odor screening distances for a sewage treatment plant, refinery, and chemical plant are two miles. The proposed project is not within this screening distance. Therefore, the proposed project would not generate objectionable odors nor be located in an area frequently subject to objectionable odors. Therefore, odor impacts would be less than significant. No mitigation is required.

Impact Summary
Impacts related to Air Quality would be less than significant. No mitigation measures are required.

14.4 BIOLOGICAL RESOURCES Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or the USFWS?	☐	☐	☐	☒
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game (DFG) or U.S. Fish and Wildlife Service?	☐	☐	☐	☒

c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e. Conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy/ordinance?	☐	☐	☐	☒
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Impact Discussion

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or the USFWS?

No Impact. The project site was mass graded sometime between 1980 and 1990 and disturbed again as part of the development of Phase 1 of the project. There is no native vegetation or habitat on the project site. Therefore, the proposed project would not have an adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service. No mitigation is required.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game (DFG) or U.S. Fish and Wildlife Service?

No Impact. As described above, the project site is in an urbanized area and has been previously graded. The subject property is bound by property walls to the north and east and, therefore, does not have upstream off-site run on. The existing project site has been rough graded and is relatively flat. It slopes in a generally south westerly direction into two existing drain inlets, located at the part of the site that tie-in to an existing 24” pipe. The project site does not contain riparian habitat, sensitive natural vegetation communities, wetlands, or other areas under the jurisdiction of the CDFW or U.S. Army Corps of Engineers. Thus, no impacts to riparian habitat or sensitive natural communities would occur. No wetlands (as defined by Section 404 of the Clean Water Act) exist or have been identified on site or immediately adjacent to the site. Therefore, the project would not result in impacts to wetlands. The proposed project would have no substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wild Service. The project site is void of riparian corridors and sensitive habitat. Thus, no impacts to riparian habitat or sensitive natural communities are anticipated. No mitigation is required.

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

No Impact. No wetlands, as defined by Section 404 of the Clean Water Act, exist or have been identified on-site or immediately adjoining the site. The site has been graded and previously graded. Thus, the project would not result in impacts to wetlands. See also the Response 14.4.b above. No mitigation is required.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

No Impact. There is no habitat, wildlife corridors or native wildlife nursery sites on or adjacent to the project site. Nor is there any water, trees or shrubs on the project site. Therefore, there is no potential for the project to interfere with the movement of native resident or migratory fish or wildlife species or impede the use of a native wildlife nursery. The project would not result in impacts related to this issue. No mitigation is required.

e) Conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy/ordinance?

No Impact. The City of Oceanside is a “Tree City USA” by the Arbor Day Foundation and the National Association of State Foresters because the City demonstrates commitment to caring for and maintaining its public trees. There are no trees on the project site. As shown on Figures 12 and 13, Conceptual Landscape Plans, the project proposes to include trees as well as various shrubs and ground cover on all sides of the project site. Implementation of the proposed project would not conflict with any local tree protection ordinances or policies. No mitigation is required.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. Oceanside is one of seven cities (Encinitas, Escondido, Carlsbad, Vista, San Marcos, Solana Beach and Oceanside) in northern San Diego County that together comprises a Natural Community Conservation Planning (NCCP) Act subregion. As such, the City has been involved in the subregional Multiple Habitat Conservation Program (MHCP) from its inception in 1991. The SANDAG coordinated and prepared the subregional MHCP Plan, which provides the framework document for each of the seven MHCP cities. The Oceanside Subarea Habitat Conservation Plan (HCP)/NCCP (SAP) represents the City's contribution to the MHCP and to regional NCCP conservation goals, and comprehensively addresses how the City conserves natural biotic communities and sensitive plant and wildlife species pursuant to the California NCCP Act and the Federal Endangered Species Act. According to Figure 4-1, Preserve Planning Map and Habitat Conservation Overlay Zones, of the SAP, the project site is not located in any preservation areas (softline or hardline), wildlife corridor planning zones, corrective action areas, or other mitigation areas as defined in the SAP (Oceanside 2010a). The project site is located in the SAP off-site mitigation zone. The proposed project would have no impact on riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations. Therefore, no impacts would occur and no mitigation is required.

Impact Summary

The project would have no impact on Biological Resources. No mitigation measures are required.

14.5 CULTURAL RESOURCES / TRIBAL CULTURAL RESOURCES Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of CEQA?	☐	☐	☐	☒
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of CEQA?	☐	☐	☐	☒
c. Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Section 21074?	☐	☐	☒	☐
d. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
e. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

Impact Discussion

a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of CEQA?

No Impact. Based on aerial photography (NETR 2019), the project site was undeveloped and vacant from 1938 to 1980, and mass-graded sometime between 1980 and 1990. Residential and commercial development occurred surrounding the site after the initial mass-grading, but the site itself has remained undeveloped. There are no historic structures, on the project site. Based on Appendix G of the State CEQA Guidelines, and the policies and regulations of the City of Oceanside, the project site and surrounding area are not designated as historically sensitive areas. Therefore, no impacts to historical resources would occur. No mitigation is required.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of CEQA?

No Impact. As stated previously, the project site was mass-graded sometime between 1980 and 1990. Therefore, although excavation activities of up to 17 feet are anticipated according to recommendations for alluvial replacement in the Geotechnical Evaluation prepared for the project, it is unlikely that cultural or tribal resources will be encountered because the soil to be replaced is fill left over from previous grading activities. Impacts are not expected. No mitigation is required.

c) Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Section 21074?

Less Than Significant. Assembly Bill (AB) 52 became effective on July 1, 2015, and requires that prior to a lead agency's release of a Notice of Preparation of an Environmental Impact Report, a Mitigated Negative Declaration or Negative Declaration (ND), the Lead Agency provide project notifications to California Native American Tribes that request such notification in writing. Once Native American Tribes receive a project notification, they have 30 days to respond as to whether they wish to initiate consultation regarding the project and specifically consultation regarding mitigation for any potential project impacts. Per City protocol, City of Oceanside staff members will contact the NAHC for a Sacred Lands File search and a list of Native American contacts. City staff members will also distribute outreach letters to the Native American contacts provided by the NAHC. Avoidance measures agreed upon between the Native American contacts and the City will be implemented. Impacts would be less than significant.

d) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No Impact. Paleontological resources (i.e., fossils) are the remains and/or traces of prehistoric plant and animal life exclusive of humans. Fossil remains such as bones, teeth, shells, leaves, and wood are found in the geologic deposits (rock formations) within which they were originally buried. Paleontological resources can be thought of as including not only the actual fossil remains, but also the collecting localities and the geologic formations containing those localities. A geologic formation is a body of crustal rock identified by its lithic characteristics (e.g., grain size, texture, color, mineral content) and stratigraphic position. The fossil content of a formation may also be a defining characteristic of that formation. The paleontological resource sensitivity of a geologic formation is directly related to the scientific significance of the fossils contained within. Therefore, a formation that has been found to contain scientifically significant fossils at other localities is considered to have paleontological resource sensitivity.

As stated previously, the project site has previously been graded. It is unlikely that paleontological resources will be encountered. Impacts are not expected. No mitigation is required.

e) Disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant. The site was mass graded in-between 1980 and 1990. It is highly unlikely that human remains will be encountered. However, in the unlikely event that human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. As mandated by California Health and Safety Code Section 7050.5, if human remains are found on the project site during construction or during archaeological work, the person responsible for the excavation, or his or her authorized representative, or the Qualified Archaeologist will immediately notify the San Diego County Coroner's office by telephone. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains will occur until the Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code 5097.98. If such a discovery occurs, a temporary construction exclusion zone will be established surrounding the area of the discovery so that the area would be protected, and consultation and treatment could occur as prescribed by law. By law, the Coroner will determine within two working days of being notified if the remains are subject to his or her authority. If the Coroner determines that the remains are Native American, he or she will contact the NAHC within 24 hours. The NAHC will then make a determination as to the Most Likely Descendent. Any Native American remains discovered on the project site will be kept in-situ, or in a secure location in close proximity to where they were found, and any analysis of the remains will only occur on-site in the presence of a Luiseño Native American monitor. At the conclusion of any analysis, any Native American remains will be repatriated to the Most Likely Descendent for re-burial, in accordance with PRC 5097.98. Impacts would be less than significant.

Impact Summary

Potential impacts to cultural resources, including tribal cultural resources, would be less than significant. No mitigation is required.

14.6 GEOLOGY AND SOILS Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving (i.) rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by	☐	☐	☒	☐

the State Geologist, or based on other substantial evidence of a known fault (Refer to DM&G Pub. 42)?; or, (ii) strong seismic ground shaking?; or, (iii) seismic-related ground failure, including liquefaction?; or, (iv) landslides?				
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d. Be located on expansive soil, as defined in Table 18-1-B of the 1994 UBC, creating substantial risks to life or property?	☐	☐	☒	☐
e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

The discussion below is summarized and based on the findings contained within the Preliminary Soil Investigation Report, Senior Living Development, Northwest of Cannon Road and Mystra Way (Geo Mat 2016) and the Geotechnical Evaluation prepared for the Ocean Hills Phase 2 Senior Facility (EEI Engineering Solutions October 2018) (Geotechnical Studies). These reports are included in this IS/MND as Appendix B.

Impact Discussion

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

> ***i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.***

Less Than Significant Impact. The project site is located within the seismically active southern California region and would likely be subjected to moderate to strong ground shaking from a regional seismic event, thus exposing the proposed project buildings and residents to seismic hazards.

There are no known active faults crossing the site. The Newport Inglewood-Rose Canyon Fault Zone is the closest of the major faults. It is located a short distance off shore, approximately 2 miles southwest of the subject site. This fault is one of the principal earthquake faults of California. It is considered coextensive with the Rose Canyon Fault of the San Diego area. The magnitude potential of earthquakes generated by this fault is frequently given as seven. However, this section of the fault zone has been determined inactive. Other major faults including: the Newport-Inglewood, Elsinore, Coronado Bank and Palos Verde are all located seven to eight miles from the project site. Fault rupture on the project site is highly unlikely. No impacts are expected. No mitigation is required.

ii) Strong seismic ground shaking?

Less Than Significant. Southern California is a seismically active region likely to experience, on average, one earthquake of Magnitude 7.0, and ten (10) earthquakes of Magnitude 6.0 over a period of 10 years. Active faults are those faults that are considered likely to undergo renewed movement within a period of concern to humans. These include faults that are currently slipping, those that display earthquake activity, and those that have historical surface rupture. The California Geological Survey (CGS) defines active faults as those which have had surface displacement within Holocene times (about the last 11,000 years). Such displacement can be recognized by the existence of sharp cliffs in young alluvium, un-weathered terraces, and offset modern stream courses. Potentially active faults are those believed to have generated earthquakes during the Quaternary period, but prior to Holocene times.

There are several active and potentially active fault zones that could affect the project site including: the Newport-Inglewood, Elsinore, Coronado Bank, Whittier, San Andreas, San Jacinto, Malibu-Coast-Raymond, Palos Verdes, San Gabriel, and Sierra Madre-Santa Susana-Cucamonga faults. Geotechnical design considerations for construction in the City of Oceanside are governed by the Oceanside Building Code, as set forth in Chapter 6, Article II, of the City's Municipal Code, which incorporates by reference the California Building Code (CBC). All buildings and other structures constructed as part of the proposed project would be designed in accordance with applicable requirements of the CBC in effect at the time of grading plan submittal, the Oceanside Municipal Code, and any applicable building and seismic codes in effect at the time the grading plans are submitted.

The Preliminary Geotechnical Report recommends that the structures should be designed in accordance with the current CBC seismic code as determined by a structural engineer. Furthermore, the Geotechnical Reports conclude that the proposed project is feasible from a geotechnical standpoint, provided the recommendations provided in the Geotechnical Reports are incorporated into the design and construction of the proposed project.

The City of Oceanside Building Department will require site preparation and building to adhere to design specification recommendations in the Preliminary Soil Investigation Report, Senior Living Development, Northwest of Cannon Road and Mystra Way (Geo Mat 2016) and the Geotechnical Evaluation prepared for the Ocean Hills Phase 2 Senior Facility (EEI Engineering Solutions October 2018), and additional future site-specific, design-level geotechnical investigations of the project. The City will also require that the proposed project is constructed in adherence to the California Building Code to minimize potential groundshaking impacts. Impacts would be less than significant. No mitigation is required.

iii) Seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Liquefaction is the loss of strength of cohesionless soils when the pore water pressure in the soil becomes equal to the confining pressure. Liquefaction generally occurs as a "quicksand" type of ground failure caused by strong groundshaking. The primary factors influencing liquefaction potential include groundwater, soil type, relative density of the sandy soils, confining pressure, and the intensity and duration of groundshaking.

According to the geotechnical studies prepared for the project, liquefaction on the project site would be unlikely due to the shallow depth of dense to very dense bedrock materials and the lack of shallow groundwater underlying the site. Accordingly, the potential for liquefaction induced lateral spreading and seismic induced settlement is also considered to be very low. Impacts would be less than significant. No mitigation is required.

iv) Landslides?

Less Than Significant Impact. Landslides are mass movements of the ground that include rock falls, relatively shallow slumping and sliding of soil, and deeper rotational or transitional movement of soil or rock. According to the geotechnical studies prepared for the project, the project site and the surrounding properties are flat and not prone to slope instability hazards, such as landslides. The project will not be impacted by a landslide or impact adjacent properties due to a project generated landslide

Site stabilization and soil compaction requirements required by project geotechnical investigation and design parameters established by the most recent California Building Code (CBC) and the City's Seismic Hazard Mitigation Ordinance would further reduce any potential impacts to less than significant. No mitigation is required.

b) Result in substantial soil erosion or the loss of topsoil?

Less Than Significant. Fine grading and trenching during the construction phase of the project would displace soils and temporarily increase the potential for soils to be subject to wind and water erosion. The contractor will be required to comply with standard engineering practices for erosion control and a qualified soils engineer will monitor soil compaction during construction. Implementation of the following mitigation measures would reduce potential soil erosion impacts to less than significant levels.

Long term, the proposed project would decrease the amount of impervious surfaces at the project site, resulting in more surface area exposed to potential erosion. However, a Storm Water Mitigation Plan (SWMP) will be prepared for the proposed project to evaluate proposed conditions related to storm water runoff. The SWMP will identify design features, Low Impact Design features, and permanent source control Best Management Practices (BMPs) to reduce long-term operational erosion impacts. Thus, there would be minimal areas of exposed soils following completion of the proposed project, and the potential for erosion would be remote. This impact is less than significant, and no mitigation is required.

Prior to the issuance of any grading permit, the project proponent is required to prepare and submit an Erosion and Sediment Control Plan for review and approval by the City Engineer or his designee. The plan will identify and detail methods that will be implemented to control erosion from graded or cleared portions of the site including, but not limited to, straw bales, sandbags, soil binders, diversion fences, desilting basins, etc. The Plan will be prepared in accordance with the City's grading ordinance, the City's water quality ordinance and the latest National Pollution Discharge Elimination System (NPDES) Regional Permit subject to the satisfaction of the City Engineer or his designee. Impacts related to soil erosion and the potential loss of topsoil would be less than significant. No mitigation is required.

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

Less Than Significant Impact. According to the geotechnical studies prepared for the project, the potential for liquefaction induced lateral spreading and seismic induced settlement is considered to be very low due to the shallow depth of dense to very dense bedrock materials and the lack of shallow groundwater underlying the site. Adherence to standard engineering practices would further reduce the likelihood of any significant impacts related to landslide, lateral spreading, subsidence, liquefaction or collapse of the land. No mitigation is required.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1997), creating substantial risks to life or property?

Less Than Significant Impact. According to the geotechnical studies prepared for the project, the onsite soils are predominantly silty sands and in general are anticipated to have a low expansion potential (EI ≤ 50). It should be noted, however, that localized clayey soils could potentially be expansive (EI > 50), and should be further evaluated during future studies or during earthwork when the proposed building pads are near finish grade. Impacts are less than significant. No mitigation is required.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Impact. The proposed project does not include the implementation of septic tanks or alternative wastewater disposal systems and would connect to the municipal sewer system. Therefore, no impacts would occur. No mitigation is required.

14.7 GREENHOUSE GAS EMISSIONS Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐

b. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

The discussion below is summarized and based on the findings contained within the Air Quality and Greenhouse Gases Technical Memorandum prepared for the Proposed Project (Roma Environmental 2019a). This Memorandum is included in this IS/MND as Appendix A.

Impact Discussion

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less Than Significant Impact. The accumulation of greenhouse gases (GHGs) in the atmosphere regulates the earth's temperature; however, emissions from human activities such as electricity production and motor vehicles have elevated the concentration of GHGs in the atmosphere. This accumulation of GHGs has contributed to an increase in the temperature of the earth's atmosphere and contributed to global climate change. GHGs include all of the following gases; carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride (NF3), and sulfur hexafluoride (California Health and Safety Code section 38505(g)). Carbon dioxide is the reference gas for climate change because it has the smallest warming potential. To account for the warming potential of different GHGs, GHG emissions are quantified and reported as CO2 equivalents (CO2e). The effects of GHG emission sources (i.e., individual projects) are reported in metric tons per year of CO2e. This allows for comparisons between projects that have different percentages of the seven GHGs. Potential global warming impacts in California may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects may include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

City of Oceanside Climate Action Plan

The April 2019, City of Oceanside General Plan Update included an Energy and Climate Action Plan Element. The City of Oceanside adopted their Final Climate Action Plan in April 2019. Therefore, the project has been compared to the goals and requirements of the Oceanside Climate Action Plan (CAP). The CAP states on pages 4-19 to 4-21 that for "proposed land use development projects, proponents shall complete the CAP Project Review Checklist. The Project Review Checklist is designed to assess consistency with GHG reduction measures identified in Chapter 3 (of the CAP). If 'Yes' for all checklist items, then the project is considered consistent with the CAP. If 'No' for any checklist item, the project's GHG impact is significant. The project must incorporate each checklist item to the maximum extent feasible; however the project's GHG impact would remain significant."

San Diego County Recommended Approach to Addressing Climate Change in CEQA Documents

Per the latest (January 2018) County of San Diego Guidelines for Determining Significance, Climate Change, there is no numerical screening level threshold of significance for GHGs. The guidelines state that "a proposed project would have a less than significant cumulatively considerable contribution to climate change impacts if it is found to be consistent with the County's Climate Action Plan; and, would normally have a cumulatively considerable contribution to climate change impacts if it is found to be inconsistent with the County's Climate Action Plan."

Significance Criteria

The project is within the boundary of the City of Oceanside and the City of Oceanside is the Lead Agency for the project; therefore, a project's consistency with the City's CAP (rather than the County CAP) would also mean that the project would have a less than significant cumulatively considerable contribution to climate change impacts. In the interest of full disclosure and per County guidance, both the existing Phase 1 and the proposed Phase 2's GHG emissions have been quantified.

The proposed project would result in GHG emissions from construction activities and long-term operational emissions after construction is completed. The California Emissions Estimator Model (CalEEMod) Version 2016.3.2 was used to quantify GHG emissions associated with construction of the proposed project, as well as long-term operations associated with landscape maintenance, energy use, water and wastewater use, solid waste, and vehicle trips. CalEEMod incorporates local energy emission factors and GHG emissions are reported as CO2e. Annual GHG emissions generated from operational activities from Phase 1 are presented in Table 5.

Table 5 Estimated Greenhouse Gas Emissions for Phase 1 (Existing)

Phase I (already constructed)	Greenhouse Gas Emissions (Metric Tons/Year)					
Category	**Bio-CO2**	**Non Bio-CO2**	**CO2**	**CH4**	**N2O**	**CO2e**
Area Sources[2]	0.00	1.38	1.38	0.00	0.00	1.42
Energy Usage[3]	0.00	235.80	235.80	0.01	0.00	236.79
Mobile Sources[4]	0.00	404.71	404.71	0.02	0.00	405.28
Solid Waste[5]	10.64	0.00	10.64	0.63	0.00	26.37
Water[6]	2.36	48.65	50.97	0.24	0.01	58.89
Total Emissions	13.00	690.54	703.50	0.91	0.01	728.75

1 Source: CalEEMod Version 2016.3.2.

2 Area sources consist of GHG emissions from consumer products, architectural coatings, and landscape equipment.

3 Energy usage consist of GHG emissions from electricity and natural gas usage.

4 Mobile sources consist of GHG emissions from vehicles.

5 Solid waste includes the CO2 and CH4 emissions created from the solid waste placed in landfills.

6 Water includes GHG emissions from electricity used for transport of water and processing of wastewater.

Annual GHG emissions that would be generated from operational activities from the construction and operational activities of Phase 2 are presented in Table 6.

Table 6 Estimated Greenhouse Gas Emissions for Phase 2 (Proposed)

Phase II	Greenhouse Gas Emissions (Metric Tons/Year)					
Category	**Bio-CO2**	**Non Bio-CO2**	**CO2**	**CH4**	**N2O**	**CO2e**
Area Sources[2]	0.00	1.24	1.24	0.00	0.00	1.27
Energy Usage[3]	0.00	213.64	213.64	0.01	0.00	214.54
Mobile Sources[4]	0.00	369.37	369.37	0.02	0.00	369.86
Solid Waste[5]	9.52	0.00	9.52	0.56	0.00	23.60
Water[6]	2.11	43.49	45.60	0.22	0.01	52.69
Construction[7]	0.00	25.32	25.32	0.00	0.00	25.43
Total Emissions	11.63	653.06	664.69	0.81	0.01	687.37

[1] Source: CalEEMod Version 2016.3.2.

[2] Area sources consist of GHG emissions from consumer products, architectural coatings, and landscape equipment.

[3] Energy usage consist of GHG emissions from electricity and natural gas usage.

[4] Mobile sources consist of GHG emissions from vehicles.

[5] Solid waste includes the CO2 and CH4 emissions created from the solid waste placed in landfills.

[6] Water includes GHG emissions from electricity used for transport of water and processing of wastewater.

[7] Construction GHG emissions are for Phase II only and based on a 20 year amortization rate.

Annual GHG emissions that would be generated from the total GHG emissions of Phases 1 and 2 combined are presented in Table 7.

Table 7 Estimated Greenhouse Gas Emissions for Phases 1 & 2 Combined

Phase I and Phase II	Greenhouse Gas Emissions (Metric Tons/Year)					
Combined	**Bio-CO2**	**Non Bio-CO2**	**CO2**	**CH4**	**N2O**	**CO2e**
Total for Phase I + Phase II	24.63	1,343.60	1,343.60	1.72	0.02	1,416.12

The data provided in Table 5 shows that for Phase 1 (existing), the operational GHG emissions would be 728.75 MTCO2e/year. For Phase 2, the data provided in Table 6 shows that the proposed project's emissions would be 687.37 MTCO2e per year. The data provided in Table 7 shows that Phase 1 and Phase 2 have a combined total of 1,416.12 MTCO2e/year. These emissions do not include reductions from any design features, location-based efficiencies, or regulatory requirements beyond 2016 Title 24 Standards. As shown below in the response to 14.7(b), the project is consistent with the City's CAP; therefore, the proposed project would have a less than significant cumulatively considerable contribution to climate change impacts. No mitigation is required.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less Than Significant Impact. As detailed above, the applicable plan for the proposed project is the CAP, which was approved by the City in April 2019. The CAP's Project Review Checklist (see Appendix C of the technical

Air Quality and Greenhouse Gas Memorandum (Appendix A) for details) is divided into seven areas: Smart Growth, Alternative-Fueled Vehicle Infrastructure, Alternative-Fuel Vehicle Parking, Transportation Demand Management, Energy Efficiency, Recycled Water and Tree Canopy. The proposed project's consistency with the Project Review Checklist from the City's CAP is examined in Table 8.

Table 8 City of Oceanside Climate Action Plan Project Consistency

Checklist Items[1]	Measures within Checklist Items[1]	Yes, No, or N/A	Support for Project Consistency with CAP
Smart Growth	1. Is the project located within an existing or potential SANDAG smart growth opportunity area (SGOA)? If "yes" proceed to Item 2 of the Checklist. If "No" proceed to Item 3 of the Checklist.	No	The site has an existing General Plan Land Use designation of General Commercial and is currently zoned as Limited Commercial District (CL). Both Phase 1 and Phase 2 of the project are Senior Living facilities and the intention of the proposed project is to create a mini congregate care campus for seniors to allow them to age in place. Therefore, the project proposes a land use that is consistent with the existing General Plan Land Use Designation and the project is consistent with the checklist item for Smart Growth Land Use.
	2. Do the proposed land use densities meet or exceed SANDAG's minimum target densities? If "yes" the project is consistent with Smart Growth Land Use; Skip to Item 4 of the Checklist; If "No" proceed to Item 3 of the Checklist.	N/A	
	3. Does the project propose land use that is consistent with, or less GHG-intensive than, the existing General Plan Land Use Designation? If "Yes" the project is consistent with Smart Growth Land Use; If "No" proceed to Item 4 of the Checklist.	Yes	
Alternative-Fueled Vehicle Infrastructure	4. For single-family residential projects, does the project include prewiring to allow for future electric vehicle charging stations in the garage or driveway of each residence? For multi-family residential projects, does the project include prewiring to allow for future electric vehicle charging stations in all garages and 5 percent of resident and visitor parking spaces (2 minimum)? For commercial or industrial projects, does the project include prewiring to allow for future electric vehicle charging stations in 10 percent of surface parking	Yes	Fifty parking stalls, including 2 electric vehicle spaces, 2 disabled access spaces, and 1 van accessible space were included in the development of Phase 1. Phase 2 includes 103 parking stalls including 95 standard spaces, 4 accessible access spaces, 1 van accessible space, and 3 electrical vehicle parking spaces. Therefore, the entire site will have a total of 5 parking spaces for electric vehicles and the project is consistent with the checklist item for Alternative-Fueled Vehicle Infrastructure.

	spaces (2 minimum) and include immediate installation of charging stations at half of these prewired parking spaces?		
Alternative-Fueled Vehicle Parking	5. For commercial or industrial projects, does the project include reserved parking for clean air vehicles at 12 percent of parking spaces?	N/A	The project is a residential retirement community and is neither a commercial nor industrial land use; however, the project does include a total of 5 electric vehicle parking spaces for clean air (electric) vehicles.
Transportation Demand Management	6. For commercial or industrial projects that would generate more than 100 vehicle commute trips per day, does the project include a minimum of 10 points of transportation demand management strategies?	N/A	The project is a residential retirement community and is neither a commercial nor industrial land use, so the checklist item is not applicable.
Energy Efficiency	7. For projects that include more than 50 surface parking spaces - Does the project incorporate on-site renewable energy sources capable of offsetting at least 50 percent of forecasted electricity demand?	Yes	The project design features include covered parking spaces with solar panels and the building's roof will be solar ready. Therefore, the project is designed to incorporate on-site renewable energy sources that would be able to off-set at least 50 percent of the forecasted electricity demand for the proposed project. Per City staff, this would be adequate to meet the CAP requirements[2].
Recycled Water	8. Does the project incorporate service connections for immediate or future recycled water use? Recycled water may be feasible for landscape, agricultural, or natural system irrigation, recreational impoundment, industrial processes, or for toilet or urinals.	N/A	The developers payed a fee in-lieu of incorporating service connections for recycled water use; therefore, this item is not applicable.
Tree Canopy	9. Does the project promote a walkable environment through incorporation of shade trees in parking lots, recreation areas, and along frontage?	Yes	Outdoor amenities for the project include: a pool, spa, bocce ball court, putting green, and fitness area. Phase 1 is connected to Phase 2 for a walkable retirement community campus. Shade trees are proposed in landscaped areas and in parking lots.

As shown in Table 8 above, the project is found is to be consistent with the City's CAP for all applicable Checklist Items. Implementation of the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. There would be a less than significant impact.

Impact Summary

Project impacts related to Greenhouse Gas Emissions would be less than significant. No mitigation measures are required.

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

h. Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

The discussion below is summarized and based on the findings contained within the Phase I Environmental Site Assessment (Phase 1 ESA) (LGC Geo Environmental, Inc. 2017) prepared for the Proposed Project. This report is included in this IS/MND as Appendix C.

Impact Discussion

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less Than Significant Impact. Hazards to the environment or the public through the transport, use, or disposal of hazardous materials are typically associated with operation of non-residential uses, such as industrial and some commercial uses. Construction of Phase 1 is completed. Construction activities for the Phase 2 would be relatively short-term October 2019 and last through March 2021 (approximately 18 months) and the transport, use and disposal of hazardous materials as part of these activities would be temporary. Construction activities would involve the use of chemical substances such as solvents, paints, fuel for equipment, and other potentially hazardous materials. These materials are common for construction activities, would be used in limited quantities, and do not pose a significant hazard to the public or the environment. Consistent with existing residential and commercial development in the vicinity of the project site, once constructed, the proposed uses would involve hazardous materials (e.g., paint, pesticides, cleansers, and solvents) for maintenance activities, but any use would be in limited quantities. The proposed project would not utilize, store, or generate hazardous materials or wastes in quantities that may pose a significant hazard to the public. The transport, use and disposal of hazardous materials during construction and operation would be conducted in accordance with existing regulations for hazardous waste transport, use and disposal, and potential impacts would be less than significant. No mitigation is required.

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

Less Than Significant Impact. No evidence of recognized environmental conditions was identified onsite (LCG 2017) and the proposed project is not anticipated to result in a release of hazardous materials into the environment. However, during the short-term period of site disturbing activities during project construction, there is the possibility of accidental release of hazardous substances such as spilling of hydraulic fluid or diesel fuel associated with construction equipment maintenance. The contractor will be required to use standard construction controls and safety procedures which would avoid and minimize the potential for accidental release of such substances into the environment.

The Phase 1 ESA prepared for the site (LGC 2017) concludes that there are no onsite conditions or any suspected conditions that would require further action. No additional studies were recommended. The impact is less than significant. No mitigation is required.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Less Than Significant Impact. During project construction, there is a possibility that hazardous emissions or hazardous substances will be transported to and from the project site, passing within one-quarter mile of an existing school on the way. Hence, there is the possibility of accidental release of hazardous substances. All materials will be transported and handled in accordance with State and Federal Hazardous Materials Regulations. Compliance with these regulations will minimize any potential for a significant impact. This impact is less than significant. No mitigation is required.

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

No Impact. A search of available environmental records was conducted by Environmental Data Resources, Inc. The proposed project site is not included on a list of sites containing hazardous materials, and would not result in a significant hazard to the public or to the environment. No historical records of hazardous material or petroleum hydrocarbon releases or any other environmental risks were found within one-mile of the project site. No mitigation is required.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Less Than Significant. The nearest airport runway at the McClellan-Palomar Airport is located approximately 2.3 miles south of the project site. The project would not result in safety hazards for people residing or working in the project area. This impact would be less than significant. No mitigation is required.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Impact. The proposed project site is not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working in the project area. No mitigation is required.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. The proposed project would have no impacts on emergency response plans or emergency evacuation plans. A facility specific emergency response plan would be developed by the applicant consistent with State licensing requirements in coordination with the Oceanside Fire Marshal as part of project permitting. No revisions to adopted emergency plans would be required as a result of the proposed project. No mitigation is required.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Less Than Significant Impact. The project site is located within 380 feet of wildland area. It is within an area designated as a high fire hazard zone in the City of Oceanside General Plan (1990); and in an area designated as a very high fire hazard zone per CalFire (2009). Both of the proposed buildings will be constructed as California Building Code Type VA, and will be fully sprinklered per National Fire Protection Association 13. Compliance with California Building Code and City of Oceanside modifications will reduce impacts to a level below significant. No mitigation is required.

Summary of Impacts

Impacts related to Hazard and Hazardous Materials would be less than significant. No mitigation is required.

14.9 HYDROLOGY AND WATER QUALITY. Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c. Substantially alter the existing drainage pattern of the site or area including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off- site?	☐	☐	☒	☐
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site?	☐	☐	☒	☐

e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f. Otherwise substantially degrade water quality?	☐	☐	☒	☐
g. Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate map or other flood hazard delineation map?	☐	☐	☐	☒
h. Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j. Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

The discussion below is summarized and based on the findings contained within the Hydrology Reports, Ocean Hills ALF–Phase 1 and Ocean Hills ALF–Phase 2 (Waber Consultants 2018 & 2019a) (Hydrology Reports); and a Storm Water Quality Management Plan prepared for the proposed project, Storm Water Quality Management Plan prepared for Ocean Hills AFF (Waber 2019b) (SWQMP). These reports are included in this IS/MND as Appendix D and E.

Impact Discussion

a) Violate any water quality standards or waste discharge requirements?

Less Than Significant. Potential impacts related to water quality would range over three different phases of project implementation: 1) during the earthwork and construction phase, when the potential for erosion, siltation and sedimentation into on-site drainages would be the greatest; 2) following construction, prior to the establishment of ground cover, when the erosion potential may remain relatively high; and 3) following completion of the project, when impacts related to sedimentation would decrease markedly, but those associated with site runoff would increase.

The proposed project could result in short-term construction impacts to surface water quality from demolition, grading, and other construction-related activities. Storm water runoff from the project site during construction could contain soils and sediments from these activities. Spills or leaks from heavy equipment and machinery and construction staging areas can also enter the runoff and typically include petroleum products such as fuel; oil and grease; and heavy metals. Building construction would also involve the use of hazardous materials (e.g., paints, solvents, and cleansers, among others) that may enter the storm water runoff. Compliance with the water quality requirements and standards set forth in the Construction General Permit would be required, including development of a Storm Water Quality Management Plan (SWQMP) prior to the start of demolition, grading, or construction. Because the proposed project qualifies as a Priority Development Project under the MS4 permit, a Priority Development Project SWQMP will be prepared for the proposed project.

Stormwater Quality Management Plans (SWQMPs) emphasize structural and nonstructural BMPs in compliance with the NPDES Regional Permit requirements. Specific measures normally include:

- Siltation of drainage devices will be handled through a maintenance program to remove silt/dirt from channels and parking areas.
- Surplus or waste material from construction will not be placed in drainage ways.
- All loose piles of soil, silt, clay, sand, debris, or other earthen materials will be protected in a reasonable manner.
- During construction, temporary gravel dikes will be used as necessary to prevent discharge of earthen materials from the site during periods of precipitation or runoff.
- Stabilizing agents such as straw, wood chips and/or soil sealant/dust palliative will be used during the interim period after grading in order to strengthen exposed soil until permanent solutions are implemented.
- Landscaped areas will be continually maintained in order to assure adequate growth and root development.
- Tenant notification regarding prohibiting discharges into the stormwater drainage system.

A SWQMP was adhered to during the construction of Phase 1 of the proposed project (June 21, 2017). A draft SWQMP has been prepared for Phase 2 of the proposed project (Waber Consultants, Inc. May 2019). SWQMPs include BMPs to reduce storm water quality impacts. The BMPs that are used during construction include watering exposed soils; covering stockpiles of soil; installing sand bags or gravel bag berms to minimize off-site runoff; creating temporary desilting basins; and timing grading to avoid the rainy season. Compliance with applicable regulatory requirements, including the implementation of BMPs identified in the SWQMPs prepared for the project, would ensure that construction related water quality impacts would be less than significant. No mitigation is required.

Runoff from proposed rooftops and surface drainage in the landscape and hardscape areas are designed to drain into the proposed storm drain system. The storm drain system is proposed to be routed to eventually drain into the proposed biofiltration basin. Overflow drains in the biofiltration basins are proposed to be routed to underground detention tanks located under the parking lot. Overflow from the detention tanks are proposed to drain into existing curb inlet catch basin in Mystra Drive to drain into the existing municipal storm drain system.

Installation of the proposed drainage facilities will protect water quality. Compliance with the statewide NPDES General Permit for Storm Water Discharges Associated with Construction Activity would prevent stormwater pollution from impacting waters of the U.S. in the vicinity of the project site. Impacts would be less than significant. No mitigation is required.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

No Impact. The project would not have the potential to substantially deplete groundwater supplies or interfere with groundwater recharge. Construction would be short-term in nature, and would not substantially affect the groundwater table which was not reached during exploratory borings up to 17 feet below the ground surface (EEI 2018). The project would not have the capacity to increase the amount of water consumed regionally through increased withdrawals from groundwater sources because no groundwater would be affected during construction or used for operation. No impacts are anticipated to occur. No mitigation is required.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

Less Than Significant Impact. There are no streams or rivers near the project site. Storm water from the project site currently flows to on-site storm drains which connect to the storm drains on Mystra Way. These drains ultimately discharge directly into the Pacific Ocean. As previously described, storm water from the project site would be treated on site and then discharged into onsite drains that would connect to drains on Mystra Way. Flows from the project site would not increase the overall flow rates compared to the existing condition.

No change in off-site drainage patterns would occur. Changes in on-site drainage flows would be local and not significant since they would be approximately equivalent to existing volumes and rates from the project site. Limited undeveloped areas on site would consist of landscaped areas that would not result in a substantial increase in the amount of erosion or sedimentation from the site after construction is complete. No significant impacts would occur, and no mitigation is required.

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Less Than Significant Impact. Refer to Response (14.9.c), above. No mitigation is required.

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Less Than Significant Impact. Construction of proposed improvements may result in minor changes in the amount of runoff due to an increase in the amount of impermeable surface area within the project site. Surface runoff velocities, volumes and peak flow rates would have a minor increase due to impervious surfaces. Due to project design, which includes a water distribution/storage tank and associated pipeline, and biofiltration, project impacts in this regard are not considered to be significant. No mitigation is required.

f) Otherwise substantially degrade water quality?

Less Than Significant Impact. Discharge from the proposed project through stormwater facilities would consist of non-point sources. Stormwater quality is generally affected by the length of time since the last rainfall, rainfall intensity, urban uses of the area, and the quantity of transported sediment. Typical urban water quality pollutants usually result from motor vehicle operations, oil and grease residues, fertilizer/pesticide uses, and careless material storage and handling. Majority of pollutant loads are usually washed away during the first flush of the storm occurring after the dry season period. However, due to project design, which includes a water distribution/storage tank and associated pipeline, and biofiltration, project impacts in this regard are not considered to be significant. No mitigation is required.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

No Impact. The proposed project area is not located within a 100-year flood hazard area. Therefore, no flood related impacts would occur. No mitigation is required.

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

No Impact. The project site is not located within a 100-year flood hazard area. Refer to Response 4.9.c and Response 14.9.d, above, for additional discussion. No mitigation is required.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Less Than Significant Impact. As previously stated, the project does not propose any new housing or building structures within the 100-year flood plain. Adherence with the current UBC design criteria relative to seismic events would reduce impacts to less than significant levels. No mitigation is required.

j) Inundation by seiche, tsunami, or mudflow?

No Impact. There are no anticipated impacts to the proposed project from seiche, tsunami or mudflow, as no topographical features or water bodies capable of producing such events occur within the project site vicinity. No mitigation is required.

Summary of Impacts

Impacts related to Hydrology and Water Quality would be less than significant. No mitigation is required.

14.10 LAND USE AND PLANNING Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Physically divide an established community?	☐	☐	☐	☒
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the General Plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Impact Discussion

a) Physically divide an established community?

No Impact. The proposed project will not have an impact on the physical arrangement of an established community because the proposed project would be developed on an existing, previously developed but currently vacant infill site. Therefore, no impacts are anticipated to occur. No mitigation is required.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The site has an existing General Plan Land Use designation of General Commercial and is currently zoned as Limited Commercial District (CL). The Project site is not located within the Coastal Zone and is therefore not subject to the City's Local Coastal Program. The proposed project is consistent with the City of Oceanside Zoning for the site as well as the City's General Plan Land Use Element's designation for the site. The project would not result in a conflict with an applicable land use plan or regulation. No mitigation is required.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?
No Impact. Refer to Response 14.4.f above, which concludes the project would not conflict with any habitat conservation plan or natural communities' conservation plan. No mitigation is required.

Summary of Impacts
The proposed project would not result in impacts related to land use and planning. No mitigation measures are required.

14.11 MINERAL RESOURCES Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

<u>**Impact Discussion**</u>

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Impact. According to the Environmental Resource Management Element of the City of Oceanside General Plan (City of Oceanside 1974), mineral deposits in the City are primarily limited to the San Luis Rey River Basin and along El Camino Real north of Oceanside Boulevard. The project site is not located on or near these deposits and the City of Oceanside does not identify any known locally or State designated mineral resource recovery sites on the project site. Therefore, implementation of the proposed project would not result in the loss of access to lands potentially containing mineral resources. In addition, The City's General Plan and Zoning Ordinance would not permit any mineral extraction on or within the vicinity of the project site. Therefore, the project would have no impact to any known mineral resources. No mitigation is required.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. Refer to Response 14.11a, above.

<u>**Summary of Impact**</u>

The project would not result in significant impacts related to mineral resources. No mitigation measures are required.

14.12 NOISE Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

The discussion below is summarized and based on the findings contained within the Noise Technical Report (Noise Report) (Roma Environmental LLC. 2019b) prepared for the Proposed Project. This report is included in this IS/MND as Appendix F.

<u>Impact Discussion</u>

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? Potentially Significant Unless Mitigated.

Less Than Significant. Noise associated with the proposed project would not be inconsistent with the City of Oceanside General Plan and Municipal Ordinance. Impacts would be less than significant. No mitigation is required.

<u>Standards Related to Construction Noise</u>

Sensitive receptors that may be affected by the proposed project include single family to the north, south and southeast, and a church and a charter school to the west.

The City of Oceanside Noise Element controls noise levels due to construction operations. It shall be unlawful for any person to operate construction equipment at any construction site, except as outlined in subsections (a-c) below:

(a) It should be unlawful for any person within any residential zone or 500' therefrom to operate any pile driver, power shovel, pneumatic, power hoist, or other construction equipment between 8 PM and 7 AM generating an ambient noise level of 50 dBA at any property line, unless an emergency exists.

(b) It shall be unlawful for any person to operate any construction equipment at a level in excess of 85 dBA at 100 feet from the source.

(c) It should be unlawful for any person to engage in construction activities between 6 PM and 7 AM when such activities exceed the ambient noise level by 5 dBA. A special permit may be granted by the Director of Public Works if extenuating circumstances exist.

The construction activities for the proposed project are anticipated to include fine grading, building construction, paving and architectural coating. Noise levels expected to occur with each piece of equipment are presented in Table 9. Construction noise associated with each phase of construction was calculated utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. (See Table 10.)

Table 9 Typical Construction Equipment Noise Levels

Type of Equipment	Range of Maximum Sound Levels Measured	Suggested Maximum Sound Levels for Analysis
Rock Drills	83-99	96
Jack Hammers	75-85	82
Pneumatic Tools	78-88	85
Pumps	74-84	80
Dozers	77-90	85
Scrappers	83-91	87
Haul Trucks	83-94	88
Cranes	79-86	82
Portable Generators	71-87	80
Rollers	75-82	80
Tractors	77-82	80
Front-End Loaders	77-90	86
Hydraulic Excavators	81-90	86
Graders	79-89	86
Air Compressors	76-89	86

Trucks	81-87	86

Source: Bolt, Beranek & Newman; Noise Control for Buildings and Manufacturing Plants, 1987.

Table 10 Project Construction Noise

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1, 2]	Distance	Item Usage Percent	Receptor Item Leq, dBA
Fine Grading					
Graders	1	85	100	40	75.0
Rubber Tired Dozers	1	85	100	40	75.0
Tractors/Loaders/Back hoes	2	80	100	40	73.0
				Fine Grading Cumulative	**79.2**
Building Construction					
Cranes	1	83	100	16	69.0
Forklifts	2	64	100	50	58.0
Generator Sets	1	82	100	40	72.0
Welders	3	64	100	40	58.8
Tractors/Loaders/Back hoes	1	80	100	40	70.0
				Building Construction Cumulative	**72.7**
Paving					
Cement and Mortar Mixers	1	85	100	40	75.0
Pavers	1	85	100	50	76.0
Paving Equipment	1	85	100	20	72.0
Tractors/Loaders/Back hoes	1	80	100	40	70.0
Rollers	1	85	100	20	72.0
				Paving Cumulative	**80.1**
Architectural Coating					
Air Compressors	1	80	100	40	70.0
				Architectural Coating Cumulative	**70.0**

Notes:
(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018).

(2) Source: https://www.google.com/url?q=http://www.noisetesting.info/blog/warehouse-forklift-workplace-noise-levels/&sa=D&source=hangouts&ust=1545259247311000&usg=AFQjCNHFcKKoEKUjv5VZMOtw_KO977Em1A

As shown in Table 10, construction noise would reach up to 80.1 dBA at a distance of 100 feet and will not exceed the City of Oceanside 85 dBA standard at 100 feet from the source. No mitigation measures are required to meet the City's standard of 85 dBA at 100 feet.

Construction work covered by a building permit is also prohibited before 7:00 AM and after 6:00 PM Monday through Saturday, and all day Sundays and major holidays. Construction of the proposed project is required to occur within the allowable hours of construction (7:00 AM to 6:00 PM Monday through Saturday). Construction activities would comply with the construction noise regulations contained in the Oceanside General Plan Noise Element (City of Oceanside 1974) and Oceanside Noise Ordinance (City of Oceanside 2018). Construction noise related impacts would be less than significant. No mitigation is required.

Standards Related to Impacts to the Proposed Project

For noise sensitive residential land uses, the City has adopted a policy which has established a “normally acceptable” exterior noise level goal of 65 dBA CNEL for the outdoor areas and the State of California land use compatibility guidelines indicate that exterior noise levels up to 70 dB Ldn or CNEL are considered acceptable for nursing homes (OPR, 2003). Additionally, an interior noise level of 45 dBA CNEL is required by the California Building Code Title 24 (Title 24, CCR, Section 1207). Interior noise levels should be mitigated to a maximum of 45 dBA CNEL in all habitable rooms when the exterior of the residence are exposed to levels of 60 dBA CNEL or more. If windows and doors are required to be closed to meet the interior noise standard, then mechanical ventilation will be provided per City requirements.

The Noise Element does not explicitly identify noise level limits for specific land use types. The State of California noise and land use compatibility guidelines indicate that exterior noise levels up to 70 dB Ldn or CNEL are considered acceptable for nursing homes (OPR, 2003). Additionally, an interior noise level of 45 dB Ldn or CNEL is required by the California Building Code Title 24 (Title 24, CCR, Section 1207).

As shown on Figures 6 and 7 of the technical noise study prepared for the project, exterior noise levels, due to buildout traffic volumes on Cannon Road, are expected to reach up to 65 dBA CNEL at the building most likely to be exposed to the most vehicular traffic noise and will not exceed City of Oceanside criteria for residential land uses (65 dBA CNEL).

The interior noise level is the difference between the projected exterior noise level at the structure’s façade and the noise reduction provided by the structure itself. Typical building construction provides 20 dB of exterior to interior noise reduction, with the windows closed (FHWA 2011). Considering that exterior noise levels due to traffic noise, may reach up to 65 dBA CNEL, interior noise levels should not exceed 45 dBA CNEL. Future traffic noise impacts related to the proposed project would be less than significant. The proposed project is consistent with the City of Oceanside General Plan standards for land use compatibility. No mitigation is required.

Standards Related to Noise Impacts Caused by On-Site Project Operational Noise

Non-transportation or stationary sources of noise are regulated by Section 38.12 of the Noise Ordinance. According to Section 38.12 of the Noise Ordinance, it is unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the property in the applicable base district zone on which the sound is produced to exceed the applicable limits shown in Table 11. The sound level limit for residential and medium density residential areas is 50 dB Leq from 7:00 AM to 9:59 PM and 45 dB Leq from 10:00 PM to 6:59 AM

Table 11 Operational Noise Level Limits

Base District Zone	7:00 AM to 9:59 PM	10:00 PM to 6:59 PM
(1) Residential Districts:		
RE (Residential Estate)	50	45
RS (Single-Family)	50	45
RM (Medium Density)	50	45
RH (High Density)	55	50
RT (Residential Tourist)	55	50
(2) C (Commercial)	65	60
(3) I (Industrial)	70	65
(4) D (Downtown)	65	55
(5) A (Agricultural)	50	45
(6) OS (Open Space)	50	45

Source: City of Oceanside Ordinance Section 38.12.

Sensitive receptors that may be affected by the proposed project include single family to the north, south and southeast, and a church and a charter school to the west. In general, senior living homes are a quiet land use and noise from the facility would be considered compatible with the surrounding land uses. Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale. However, the instantaneous sound levels generated by a car door slamming and engine starting up may be an annoyance to adjacent sensitive receptors. The estimated maximum noise levels associated with parking lot activities typically range from 60-65 dBA and are short term. It should be noted that parking lot noise are instantaneous noise levels compared to noise standards, which are averaged over time. As a result, actual noise levels over time resulting from parking lot activities would be far lower. Therefore, the proposed parking would not expose nearby sensitive receptors to substantial noise levels and impacts will be less than significant. No mitigation is required.

Section 38.16 of the Noise Ordinance states, it shall be unlawful for any person to make, continue, or cause to be made or continued, within the limits of the City of Oceanside, any disturbing, excessive, or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity.

Section 38.17 of the Noise Ordinance prohibits the operation of any pneumatic or air hammer, pile driver, steam shovel, derrick, steam, or electric hoist, parking lot cleaning equipment or other appliance, the use of which is attended by loud or unusual noise between the hours of 10:00 PM and 7:00 AM

HVAC units would be included on the roof of the proposed office building and would be placed within roof wells and shielded which would further reduce the noise. No heating, ventilation, air conditioning equipment (HVAC) will be situated within 5 feet of nearby sensitive receptors. Typically, HVAC noise is 50-55 dBA at 50 feet from the source. The noise from the HVAC units would not exceed the City's Noise Standards at the nearest existing residents.

Noise generated from residential uses is generally from sources such as amplified music, barking dogs, and landscape maintenance equipment that may be disturbing to other residents. Section 38.16 of the Oceanside

Municipal Code prohibits nuisance noise at any time which causes discomfort or annoyance to reasonable persons of normal sensitivity. Compliance with the noise ordinance would limit exposure to excessive nuisance noise. The Oceanside Police Department enforces the nuisance noise provisions of the noise ordinance. Additionally, nuisance noises would be different from each other in kind, duration, and location, so that the overall effects would be separate and in most cases would not affect the receptors at the same time. Instances of nuisance noise would be addressed on an individual case basis by the Oceanside Police Department.

The project site would be landscaped; therefore, regular maintenance would be required. Maintenance activities would include the use of mowers, trimmers, and blowers, which would result in intermittent short-term temporary noise increases. Maintenance activities are permitted uses and would be subject to the daytime one-hour Leq noise limits in residential neighborhoods. Maintenance equipment would not be operating at any one location for more than a few minutes and it is not likely that the equipment would be operating all at the same time. Due to the limited amount of time the equipment would be operating in one location, operation of maintenance equipment would generally not exceed the hourly noise level limit at adjacent residential receptors and no impacts are anticipated. Operational noise impacts would be less than significant. No mitigation is required.

Standards Related to Noise Impacts Caused by Project Generated Off-Site Vehicle Trips

Project generated average daily trips on affected roadways were calculated and assigned to affected road segments using Existing Traffic Volume and Project Buildout Trip Assignment exhibits provided in the traffic study prepared for the project (Rick Engineering 2018). Modeling was conducted to compare existing and existing plus project noise levels at a distance of 50 feet from the centerline of affected road segments. Existing and Existing Plus Project vehicle noise levels are shown in Table 12. In no case would the proposed project result in an increase of 5 dB or greater along affected road segments. The project would not generate a sufficient amount of vehicle trips to result in a noticeable increase in ambient noise levels. This impact is less than significant. No mitigation is required.

Table 12 Comparison of Existing and Existing Plus Project Noise Levels Along Roadways

Roadway	Segment	CNEL at 50 Feet dBA		Change in Noise Level Existing and Existing Plus Project
		Existing Without Project	Existing Plus Project	
Cannon Road	North and South of Project Site	67.24	67.88	0.64
Mystra Way	West of Cannon Road	54.97	55.67	0.70

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact. Construction operations have the potential to result in varying degrees of temporary ground vibration, depending on the specific construction equipment used and operations involved. The ground vibration levels associated with various types of construction equipment are summarized in Table 13. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. The effects of ground vibration may be imperceptible at the lowest levels, low rumbling sounds and detectable vibrations at moderate levels, and slight damage to nearby structures at the highest levels. Buildings respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Typically, particle velocity or acceleration (measured in gravities) is used to describe vibration in context of potential structural damage.

Table 13 Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level LV (dVB) at 25 feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(Slurry wall)	0.017 in rock	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.

The City of has not yet adopted vibration criteria. The California Department of Transportation (Caltrans) has published one of the seminal works for the analysis of groundborne noise and vibration relating to transportation- and construction-induced vibrations and although the project is not subject to these regulations, it serves as useful tools to evaluate vibration impacts. These guidelines recommend that a standard of 0.2 inches per second (in/sec) peak particle velocities (PPV) not be exceeded for the protection of normal residential buildings (Caltrans 2013b). A PPV of 0.2 in/sec is also the vibration level at which vibration may become annoying (Transit Noise and Vibration Impact Assessment, FTA, May 2006). Table 13 shows the PPV of some common construction equipment and Table 14 shows typical human reactions to various levels of PPV as well as the effect of PPV on buildings.

Table 14 Typical Human Reaction and Effect on Buildings due to Groundborne Vibration

Vibration Level Peak Particle Velocity (PPV)	Human Reaction	Effect on Buildings
0.006–0.019 in/sec	Threshold of perception, possibility of intrusion	Vibrations unlikely to cause damage of any type

0.08 in/sec	Vibrations readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
0.10 in/sec	Level at which continuous vibration begins to annoy people	Virtually no risk of "architectural" (i.e., not structural) damage to normal buildings
0.20 in/sec	Vibrations annoying to people in buildings	Threshold at which there is a risk to "architectural" damage to normal dwelling – houses with plastered walls and ceilings
0.4–0.6 in/sec	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage. At 0.5 PPV possible cosmetic structural damage to buildings built of reinforced concrete, steel or timber.

Source: Bolt, Beranek & Newman; Noise Control for Buildings and Manufacturing Plants, 1987.

As shown in Table 14, the threshold at which there may be a risk of architectural damage to normal houses with plastered walls and ceilings is 0.20 PPV in/sec. The nearest existing sensitive receptors are single family residential homes located approximately 30 feet to the north and east of the project boundary. As shown in Table 13, a vibratory roller can generate 0.21 PPV at a distance of 25 feet, and a large bulldozer can generate groundborne vibration of up to 0.089 PPV at 25 feet. At 30 feet, groundborne vibration levels may reach up to 0.172 PPV with use of a vibratory roller, and up to 0.073 PPV with use of a larger bulldozer. Operation of vibratory equipment on the project site is not expected to result in damage to existing single family homes. Impacts related to groundborne vibration would be less than significant. No mitigation is required.

b) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Less Than Significant. As discussed in 14.11.a above, the operation of the proposed project would include light traffic noise and stationary noise from HVAC equipment. Neither operational source would result in an increase of 5 dB or greater. Impacts would be less than significant. No mitigation is required.

c) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Less Than Significant. As noted above, the implementation of the proposed project may result in short-term increased noise levels within the project vicinity due to construction activities. Construction of the proposed project is required to occur within the allowable hours of construction (7:00 AM to 6:00 PM Monday through Saturday). Construction activities would comply with the construction noise regulations contained in the

Oceanside General Plan Noise Element (City of Oceanside 1974) and Oceanside Noise Ordinance (City of Oceanside 2018). Construction noise related impacts would be less than significant. No mitigation is required.

d) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Less Than Significant Impact. The closest airport in the project vicinity, McClellan-Palomar Airport, is located approximately 2.3 miles south of the project site. The next nearest airport, the Oceanside Municipal Airport, is located approximately 5.6 miles to the north. The project site is not located within a 60-65 dB CNEL noise contour associated with either airport (San Diego Regional Airport Authority, 2010). The proposed project would not be exposed to excessive noise from the airfield and exposure to aircraft noise would be less than significant. As previously stated, the proposed project is not located within two miles of a public airport or public use airport. Impacts would be less than significant. No mitigation is required.

e) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The proposed project site is not located within the vicinity of a private airstrip and would not expose people residing or working in the project area to excessive noise levels. No mitigation is required.

Summary of Impacts

Impacts would be less than significant. No mitigation is required.

14.13 POPULATION & HOUSING Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Impact Discussion

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Less Than Significant Impact. According to the State Department of Finance (DOF), the City of Oceanside had a 2010 population of 167,924 persons and a 2010 housing stock of 64,474 dwelling units. The City had an average household size of 2.82 persons per household and a vacancy rate of 8.1 percent (DOF 2015). The proposed project would increase the City's housing stock by approximately 244 residents (e.g. 244 patient beds). Therefore, implementation of the proposed project would equate to less than 1 percent (0.0014 percent) of the total housing stock in the City. However, it is unlikely that all of the project's residents would be new residents to the City as current city residents may choose to relocate to the project site once construction is complete.

The entire facility will employ approximately 40 full time and part time members of staff working at peak times (8:00 am to 6:00 pm). Although this is considered new job creation, this is a negligible increase when compared to the total existing or projected jobs in the City of Oceanside or San Diego County. In addition, the project would generate short-term construction-related jobs. The proposed project would not induce growth through the extension or expansion of major capital infrastructure. The proposed project is not anticipated to generate substantial population growth in the area. Impacts would be less than significant. No mitigation is required.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

No Impact. The site is currently vacant. Implementation of the proposed project would not require the removal of existing housing, and therefore would not necessitate the construction of replacement housing elsewhere. No mitigation is required.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. Refer to Response 4.13a and 4.13b, above. No mitigation is required.

Summary of Impacts

The project would not result in significant impacts related to population and housing. No mitigation measures are required.

14.14 PUBLIC SERVICES Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. Fire Protection?	☐	☐	☒	☐
2. Police Protection?	☐	☐	☒	☐
3. Schools?	☐	☐	☐	☒
4. Parks?	☐	☐	☐	☒
5. Other public facilities?	☐	☐	☐	☒

Impact Discussion

1) Fire protection?

Less Than Significant Impact. Fire protection, prevention, and emergency medical services for the project site and vicinity are provided by the City of Oceanside Fire Department (OFD). There are eight fire stations in the City; however, the nearest is Station #4, located at 3990 Lake Blvd, approximately 3.2 miles northwest of the project site. The OFD's goal is to reach all medical emergencies and all fires within 5 minutes, 90 percent of the time. All truck and engine companies are staffed with a minimum of one company officer, one engineer, and one firefighter/paramedic. Oceanside is part of a mutual aid agreement with all San Diego County fire agencies, which allows for fire and emergency services from other agencies to assist the OFD as necessary. Increased demands for fire protection and related services result from increases in permanent population, but can also be related to the size, height, and type of land uses. The proposed project includes 244 patient beds which would result in approximately 244 new residents if every resident of the proposed project was new to the City of Oceanside. Although the proposed project is not anticipated to generate the need for new firefighters or other personnel, it will require fire protection services and it is expected that the proposed project would potentially increase the number and range of service calls by the OFD at the project site. Increased services would include responding to structural fires, providing emergency medical and rescue services, and performing hazardous materials inspections and response. Increased traffic on City streets may also increase the potential for accidents, requiring emergency services, including administrative tasks associated with approval and construction of the proposed project (e.g., building plan check). This increase in demand for fire protection services would not require the construction of new or alteration of existing fire protection facilities to maintain an adequate level of fire protection service to the project area. The project is also consistent with buildout projections and analysis conducted for the City's General Plan. The project will not result in physical impacts associated with the provision of fire protection services, and no mitigation is required.

The City of Oceanside also imposes a Public Facility Fee on new residential and non-residential development for the purpose covering the actual or estimated costs of constructing needed public facilities per Chapter 32B, Impact Fees, of the City of Oceanside Municipal Code.

Additionally, the proposed project would be required to comply with all applicable codes, ordinances, and regulations (including the City of Oceanside Municipal Code, which adopts by reference the California Fire Code) regarding fire prevention and suppression measures; fire hydrants and sprinkler systems; emergency access; and other similar requirements. Notably, the proposed residential units would be equipped with fully automatic fire sprinkler systems for fire protection, and there is an existing fire hydrant on the project site, southern corner of the project site at the intersection of Mystra Way and Cannon Road. Compliance with applicable fire safety requirements would prevent the creation of fire hazards at the project site and would facilitate evacuation and emergency response in the event of a fire. This would minimize project demand for fire protection services. Thus, no significant impacts related to fire protection services would result from the proposed project, and no mitigation is required.

2) Police protection?

Less Than Significant Impact. Police protection for the project site is provided by the City of Oceanside Police Department (OPD). The police station is located at 3855 Mission Avenue, approximately 9 miles north of the project site. The OPD has an authorized budget for 211 sworn and 89 professional staff members, and handles approximately 75,000 calls for service each year (OPD 2015). The OPD maintains the following departments: Field Operations, Investigations, Crime Services, and Administration. The Patrol Division under Field Operations is the largest division in the OPD with 113 officers and 13 field evidence technicians assigned (OPD 2015). The OPD operates two resource centers, the Police Beach Facility and the Downtown Resource Center, which are designed to provide a sense of community and security to residents of the surrounding area and also to serve as a component of the OPD’s community policing philosophy. The Downtown Resource Center is located at 401 Mission Avenue #C-122, approximately 0.10 mile southeast of the project site. The OPD’s senior volunteers, along with other volunteers, staff the Police Resource Centers. They assist community members with preparing crime reports and other police-related functions. The senior volunteers will take reports for crimes such as car burglaries and vandalism. Residents can also obtain crime prevention information and educational materials at the centers (OPD 2015).

Although there would be a relatively small number of new residents generated by the proposed project (approximately 244 residents), the introduction of additional residential uses at the project site would require increased police protection services compared to existing conditions. During operation, the proposed project could create the typical range of police service calls that other similar uses in the City experience. The increase in vehicle trips on public roadways resulting from the proposed project could also increase the potential for traffic accidents and violations. This increase in demand for police protection services as result of the proposed project would not require the construction of new or alteration of existing police department facilities to maintain an adequate LOS to the project area. Therefore, no physical impacts associated with the provision of police protection services would occur, and no mitigation is required. The City of Oceanside also imposes a Public Facility Fee on new residential development for the purpose OF meeting the actual or estimated costs of constructing needed public facilities. There are no significant impacts related to police protection or service anticipated with implementation of the proposed project, and no mitigation is required.

3) Schools?

No Impact. Due to the nature of the proposed project as a senior living facility and the anticipated age of the majority of its residents, implementation of the proposed project would not result in the need for the construction of additional school facilities. Therefore, no impacts in this regard will occur. No mitigation is required.

4) Parks?

No Impact. Due to the nature of the proposed project as a senior living center and the anticipated age of the majority of its residents and the provision of onsite amenities for residents, implementation of the proposed project will not affect any existing park facilities nor increase the demand for additional recreational facilities. Therefore, no impacts to parks are anticipated as a result of this project. No mitigation is required.

5) Other public facilities?

No Impact. The Oceanside Public Library provides library services to the City of Oceanside through the City's main library, the Civic Center Library, located at 330 North Coast Highway. The Oceanside Public Library system also has a Mission Branch Library located at 3861-B Mission Avenue. The proposed project would not result in substantial population growth. Therefore, the proposed project would not result in increased demand for libraries or other public services such that new or expanded facilities would be required. Therefore, no physical environmental impacts would result. No significant impacts to other public facilities are anticipated to occur with project implementation. No mitigation is required.

Summary of Impact

Impacts related to public services would be less than significant. No mitigation measures are required.

14.15 RECREATION Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities, such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Impact Discussion

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impact. Due to the nature of the proposed project as a senior living facility and the anticipated age of the majority of its residents and the provision of onsite amenities for residents, implementation of the proposed project will have nominal effects to existing regional parks or other recreational facilities, nor increase the demand for additional recreational facilities. Therefore, implementation of the proposed project will not generate an increase in demand on existing public or private parks or other recreational facilities that would either result in or increase physical deterioration of the facility. No mitigation is required.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact. The proposed project includes internal recreational amenities/facilities onsite for its residents. Implementation of the proposed project does not include offsite recreational facilities that would have an adverse effect on the environment. No mitigation is required.

Summary of Impacts

The project would not impact recreational resources. No mitigation measures are required.

14.16 TRANSPORTATION/TRAFFIC Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass-transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion/management agency for designated roads or highways?	☐	☐	☒	☐

c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e. Result in inadequate emergency access?	☐	☐	☐	☒
f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

The discussion below is summarized and based on the findings contained within the Focused Traffic Impact Study (Traffic Study) (Rick Engineering 2018) prepared for the proposed project. This study is included as Appendix F.

Impact Discussion

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass-transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

Less Than Significant Impact. Based on the traffic study prepared for the proposed project, Phase 1 of the proposed project is estimated to generate a total of 369 weekday trips, including 26 AM peak hour trips and 26 PM peak hour trips; and Phase 2 of the proposed project is estimated to generate 354 weekday trips, including 25 AM peak hour trips and 25 PM peak hour trips. The combined Phase 1 and Phase 2 projects (project buildout) are estimated to generate 723 weekday trips, including 51 AM peak hour trips and 51 PM peak hour trips. Due to the project site being in close proximity to New Venture Christian Fellowship Church, an analysis of project impacts on a Sunday was also performed. Phase 1 of the proposed project is estimated to generate a total of 228 Sunday trips, including 25 trips during the Sunday peak hour. The Phase 2 project is estimated to generate 202 Sunday trips, including 22 trips during the Sunday peak hour. The combined Phase 1 and Phase 2 projects (project buildout) are estimated to generate 430 Sunday trips, including 47 trips during the Sunday peak hour.

A LOS analysis was conducted to evaluate intersection and roadway segment operations with buildout of the proposed project. Per the traffic study prepared for the proposed project, affected roadways and intersections will operate at an acceptable LOS B. Therefore, no significant impacts were identified.

Due to the nature of the proposed project as a senior living center, the proposed project is not expected to result in a substantial demand for off-site transportations facilities or public transportation. Impacts related to transportation would be less than significant. No mitigation is required.

b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion/management agency for designated roads or highways?

Less Than Significant Impact. The proposed project would result in a slight increase of traffic on streets in the project vicinity during construction and operation. During morning and evening weekday peak traffic hours, the proposed project would generate up to 51 vehicle trips (Rick Engineering, 2018). During Sunday peak hour the proposed project would generate a total of 47 vehicle trips. The proposed project would result in less than one trip per minute during peak-hour traffic, resulting in a minimal increase. Refer to Response 14.16a, above. No mitigation is required.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

No Impact. The McClellan-Palomar Airport is located approximately 2.3 miles to south of the project site. The project would not change air traffic patterns. The proposed project would also not directly increase the amount or location of air traffic. There would be no impact, and no mitigation is required.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Impact. No new public roadways are proposed as part of the project, therefore, no impacts regarding design features or incompatible uses would occur. The proposed project would take access from Cannon Road and Mystra Way. The project would not result in an increase in hazards due to a design feature. No mitigation is required.

e) Result in inadequate emergency access?

No Impact. Adequate emergency access will be provided during both short-term construction and long-term operation of the proposed project. Impacts are not anticipated to be significant. No mitigation is required.

f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

No Impact. Project implementation would not conflict with adopted policies, plans, or programs supporting alternative modes of transportation. Therefore, no impacts are anticipated. No mitigation is required.

Summary of Impact

The project would result in less than significant impacts to Transportation or Traffic. No mitigation measures are required.

14.17 UTILITIES AND SERVICE SYSTEMS Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the projects projected demand in addition to the providers existing commitments?	☐	☐	☒	☐
f. Be served by a landfill with sufficient permitted capacity to accommodate the projects solid waste disposal needs?	☐	☐	☒	☐
g. Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

Impact Discussion

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

Less Than Significant Impact. Wastewater from the proposed project would consist of sewage flows and wastewater from the 244 residents and 40 employees of the facility. The sewage flows and wastewater would ultimately be treated by facilities owned and operated by the City of Oceanside Wastewater Division, which collects, treats, and disposes of all the City's sewage at two facilities (the San Luis Rey Wastewater Treatment Plant [WWTP] and the La Salina WWTP) in Oceanside. The La Salina WWTP serves areas west of I-5. The City complies with the wastewater discharge requirements (WDR) issued by the State Regional Water Quality Control Board for their facilities, including the San Luis Rey WWTP. The WDR ensures that adequate levels of treatment are provided to wastewater flows emanating from all land uses in the City's wastewater service area. The wastewater from the proposed project would not require treatment beyond that provided to existing residential and commercial uses in the City of Oceanside and would not exceed established treatment requirements in the WDR. No impacts are anticipated, and no mitigation is required.

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less Than Significant. Water Facilities - The City of Oceanside Water Division (Water Division) is responsible for producing, storing, and distributing potable water to the City and for maintaining the City's water system infrastructure. The Water Division operates and maintains over 500 miles of waterlines that distribute water throughout the City and 12 reservoirs with a capacity of 50.5 million gallons. The currently vacant infill lot does not require potable water. Based on an estimated domestic water usage of 942 gallons per bed per day (Los Angeles, 2006) approximately 229,848 gallons per day (gpd) would be consumed by the proposed project (exclusive of irrigation of the landscaped areas).

Based on the City Geographic Information Maps (GIS), there are water lines within Cannon Road (14-inch) and Mystra Way (8-inch) that could serve the project site. As part of the proposed project, new water lines would be installed and would connect to the existing water lines. There is existing capacity in the existing water lines to accommodate the demand and fire flow requirements for the proposed project. No new water lines or upgrades to existing water lines would be required. No mitigation is required.

Wastewater Facilities - There is currently no wastewater generated at the project site as the site is currently vacant. The proposed 244 patient beds are projected to generate an average daily sewage flow of 75 gallons per bed per day (Los Angeles, 2006) with a peak flow of 18,300 gpd would occur with the proposed project. Based on the City GIS maps, the City of Oceanside has an existing sewer line in Cannon Road (8-inch) and Mystra Way (8-inch) which could convey wastewater from the project site to the main trunk sewer lines for treatment at the San Luis Rey WWTP. The increase in water consumption and wastewater generation resulting from the proposed project would not require new or upgraded water lines, sewer lines, or wastewater treatment facility/capacity off site to serve the proposed project. The proposed water and sewer lines would be constructed on the project site, and utility installations are within the construction impact limits established for the proposed project. No additional physical impacts related to the construction and operation of water or sewer lines would occur beyond that addressed in this IS for the proposed project. No mitigation is required.

c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less Than Significant. The storm water runoff from the project site would not exceed the capacity of the storm drain system, and no new or expanded off-site storm drain facilities would be required. The proposed storm drain retention systems lines would be constructed on the project site, and utility installations are within the construction impact limits established for the proposed project and would connect to an existing storm drain line in Mystra Way. No additional impacts related to the construction and operation of storm drain lines would occur, and no mitigation is required. Refer also to the discussion above under 14.9.a.

The proposed project would not require construction of new off-site stormwater facilities or the expansion of existing facilities which could cause significant impacts. No mitigation is required.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

Less Than Significant. The majority (87 percent) of the City's water is purchased from the San Diego County Water Authority (SDCWA). The City's remaining water (13 percent) comes from the Mission Basin (Oceanside 2015e). The SDCWA is a public agency serving the San Diego region as a wholesale supplier of water from the Colorado River and Northern California. The SDCWA's mission is to provide a safe and reliable supply of water to its 24 member agencies serving the San Diego region. The SDCWA has been importing water to meet the region's needs for more than 60 years. As a wholesale agency, the SDCWA purchases its water from the Metropolitan Water District of Southern California (MWD). In 2014, the SDCWA had reduced its reliance on MWD supplies to 49 percent or 325,000 acre-feet. By 2020, reliance on MWD water is projected to decrease to 30 percent or 231,000 acre-feet. In addition, the SDCWA also obtains water via long-term Colorado River water conservation and transfer agreements with agencies in the Coachella Valley and Imperial County. Specifically, the SDCWA has secured new imported water supplies through a long term (45–75 years) water conservation and transfer agreements with the Imperial Irrigation District, which provided 100,000 acre-feet of water in 2014 and is estimated to increase to 200,000 acre-feet annually by 2021. The SDCWA also has a separate 110-year agreement to receive Colorado River water conserved by lining parts of the Coachella and All-American canals, which provide 80,000 acre-feet of water to the region annually. Raw water purchased from the SDCWA is treated at the City-owned Robert A. Weese Filtration Plant prior to delivery into the City of Oceanside's distribution system. According to the 2010 Urban Water Management Plan (UWMP), the City is planning on an expansion that would increase capacity from 25 mgd to 37.5 mgd at the Robert A. Weese Filtration Plant.

Mission Basin. The Mission Basin lies almost entirely within the limits of the City of Oceanside and extends upstream from the Pacific Ocean to just past Oceanside's eastern boundary and west of the Bonsall Bridge near the intersection of SR-76 and SR-13. The volume of groundwater currently in storage within the alluvial aquifers (shallow and deep) in the Mission Basin is estimated to be 54,000 acre-feet. The volume of unused storage within the alluvium (occurring between the water table and the ground surface) was estimated to be 9,000 acre-feet. The amount of this storage that is unusable has not been determined. Water from the Mission Basin is extracted and becomes potable water through a reverse osmosis desalting process at the City-owned Mission Basin Groundwater Purification Facility. The facility was put into service in 1992 with a capacity of 2.0 mgd and expanded to its current capacity of 6.4 mgd in 2002 (Oceanside 2015d). The City of Oceanside's 2010 UWMP reports on water reliability sources and identifies projected supplies to meet the long term demand of the City. It identifies supply capacities through 2035 under the three hydrologic conditions: single dry year, multiple dry years, and average year. In 2010, the total water demand in the City was approximately 23,823 acre-feet. Projected demand in 2015 is 31,792 acre-feet and 31,282 acre-feet by 2035. According to the SDCWA's 2010 UWMP, "SDCWA concluded that if projected SDCWA and member agency supplies are developed as planned, along with Metropolitan Water District of Southern California's (MWD) Integrated Resources Plan (IRP), no shortages are anticipated within SDCWA's service area under normal-year, single-dry year or multiple dry water years through 2030." The UWMP further says that under the specific parameters assumed in the multiple dry year analysis, some level of shortage could potentially be experienced.

In the event of a shortage, the SDCWA would use their carryover storage supply and, if necessary, additional regional shortage management measures, consistent with the SDCWA's Water Shortage and Drought

Response Plan. Therefore, it is therefore expected that the City will be able to meet customer demands during a multiple dry year event now and in the future.

In January 2014, California Governor Brown declared a drought state of emergency and directed State officials to take all necessary actions to make water immediately available. He asked for a reduction in water consumption by 20 percent. The SWRCB was to consider petitions that could streamline water transfers and exchanges between water users and to notify water rights holders that they may be directed to cease or reduce water diversions based on water shortages. The SWRCB was also asked to modify requirements for releases of water from reservoirs or employ diversion limitations so that water may be conserved in reservoirs to protect cold water supplies for salmon, maintain water supplies, and improve water quality. The Department of Water Resources (DWR) and the SWRCB were also directed to accelerate funding for projects that could enhance water supplies.

The DWR is to lead a statewide initiative, in partnership with local agencies, to collectively replace 50 million square feet of lawns and ornamental turf with drought tolerant landscapes, and the California Energy Commission is to implement a statewide appliance rebate program to provide monetary incentives for the replacement of inefficient household devices. In response to the Executive Order, the City of Oceanside plans to meet water use reductions in their service area through outreach and communication efforts to ensure customers understand the water use reduction requirements as well as providing tools and resources including rebates, water consultations, landscape surveys, and water leak investigations to aid customers in conservation efforts. In addition, on May 20, 2015, the City adopted an Urgency Ordinance, which amends the City's Municipal Code, Chapter 37, Article V, by revising and updating the water conservation program and the drought response conservation measures. Among other items, the ordinance establishes water conservation requirements at various Drought Response Levels (Drought Response Level 1 is a "Drought Watch Condition") and Drought Response Level 2 is a "Drought Alert Condition") (Oceanside 2015f).

The City of Oceanside is currently at a Level 1 Drought Response, requiring customers to strictly adhere to current use restrictions. As discussed in Threshold "b" above, the proposed project would have a net increase in water consumption compared to existing conditions. Additionally, the proposed project would be required to comply with the City of Oceanside's "Water Conservation" code, which was amended in July 2008 through the adoption of City Ordinance No. 08-IR0439-1 to revise the existing water conservation program and add drought response conservation measures that were to be implemented in the event of mandatory water reductions. The City prepared a Water Conservation Master Plan in June 2011, which aims to meet a State-mandated per-capita use reduction target of 25 gallons per capita per day by 2020. Furthermore, the proposed project would be required to adhere to applicable requirements outlined in the City of Oceanside Drought Response Ordinance for water conservation adopted in May 2015.

The increase in water demand generated by the proposed project could be accommodated by the City of Oceanside without impacting current water supplies. The project would comply with the City's water conservation programs, including landscape and irrigation requirements, water regulations, and the water supply shortage conservation plan. Therefore, the project would not significantly impact the City of Oceanside's domestic water supply. Additionally, no new or expanded entitlements would be required with implementation of the proposed project. Impacts would be less than significant, and no mitigation is required.

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Less Than Significant Impact. Refer to Response 14.17a, above. No mitigation is required.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

Less Than Significant Impact. The City requires that construction waste be handled in accordance with the requirements of Section 4.408, Construction Waste Reduction, Disposal and Recycling, of the California Green Building Code (2016). Notably, a minimum of 50 percent of the nonhazardous construction and demolition waste is required to be recycled or salvaged. Additionally, a construction waste management plan would be prepared and submitted to the City.

Based on an estimated operational solid waste disposal factor of approximately 5 pounds (lbs) per person per day for nursing/retirement home land uses (CalRecycle 2019), the proposed project would generate approximately 420 pounds of solid waste per day (76.65 tons per year). However, compliance with the City's requirements for waste diversion, as discussed under Threshold "g" below, would reduce the amount of solid waste diverted to the receiving landfill. The City of Oceanside is under contract with Waste Management of North County to provide waste and recycling collection service to the City; Waste Management of North County provides service in Oceanside, Carlsbad, Del Mar, Solana Beach, Camp Pendleton, and several unincorporated areas of San Diego County. Solid waste generated at the project site would be disposed of at the El Sobrante Landfill, located at 10910 Dawson Canyon Road in Corona. The landfill is located in Riverside County and is privately owned and operated by Waste Management. The landfill is a Class 3 regional disposal facility permitted to accept up to 70,000 tons per week, 24 hours a day. The El Sobrante Landfill has a maximum permitted throughput of 16,054 tons per day with an estimated remaining capacity of 145,530,000 tons and projected closure date of January 1, 2045 (CalRecycle 2015). Waste Management, Inc. (Waste Management) would collect commingled project recyclables which would be transferred to its Recycling CORE Facility located at 2050 North Glassell Street in the City of Orange. Construction and demolition (C&D) waste can either be disposed of by the contractor at Moodys El Corazon Recycling, a privately operated C&D landfill located at 3210 Oceanside Boulevard in the City of Oceanside, or disposed of by Waste Management. Waste Management would transfer project-generated construction waste to a privately operated C&D facility in San Marcos, EDCO.

Solid waste disposal associated with the construction and operation of the proposed project could be accommodated within the permitted capacity of the designated landfill and other waste management facilities. No mitigation is required.

g) Comply with federal, state, and local statutes and regulations related to solid waste?

Less Than Significant Impact. The California Integrated Waste Management Act, also known as AB 939, created the Board now known as the California Department of Resources Recycling and Recovery (CalRecycle) and accomplished the following: (1) it required each jurisdiction in the State to submit detailed solid waste planning documents for CalRecycle approval; (2) it set diversion requirements of 25 percent in 1995 and 50 percent in 2000; (3) it established a comprehensive Statewide system of permitting, inspections, enforcement, and maintenance for solid waste facilities; and (4) it authorized local jurisdictions to impose fees based on the types or amounts of solid waste generated. Jurisdictions select and implement the combination of waste prevention, reuse, recycling, and composting programs that best meet the needs of their community while achieving the diversion requirements. Senate Bill (SB) 1016, passed in 2008, introduced a per capita disposal measurement system that measures the 50 percent diversion requirement using a disposal measurement equivalent. In 2017, California had a per-resident disposal rate of 5.2 pounds/resident/day and a "diversion rate equivalent" of 58 percent. The 2017 per employee disposal rate was 11.9 pounds/employee/day. The per employee "diversion rate equivalent" was at 62 percent. (CalRecycle 2019). In compliance with State requirements, the City of Oceanside is successfully diverting more than 50 percent of its waste stream.

Building upon and exceeding AB 939 goals and pursuant to State of California AB 341, which was approved in October 2011 and is designed to help meet California's recycling diversion goal of 75 percent by 2020, the City of Oceanside enacted a Zero Waste Plan in 2012. The Plan identifies the same goal as identified by AB 341 (75 percent diversion/recycling rate by 2020). Currently, the City has reached a diversion/recycling rate of 72 percent through the implementation of numerous waste reduction and recycling programs. These include Zero Waste Recommendations such as changing the culture to zero waste, reduce and reuse, recycling, composting, proper recycling of special discards including bulky items, and implanting zero waste policies. The Plan identifies that once the strategies detailed in the Zero Waste Plan are fully implemented, a diversion rate higher than 75 percent will be achieved and ultimately will meet the international standard of 90 percent to become a Zero Waste Community. The City is in compliance with AB 939 and is near meeting AB 341 compliance well before its stated target year of 2020. The project site would continue to be served by Waste Management for the collection of solid waste and recyclables, and the proposed project would be required to comply with ongoing waste management programs/requirements implemented by the City, as well as comply with applicable regulations. Impacts associated with the proposed project would be less than significant. No mitigation is required.

Summary of Impacts

Project impacts to utilities and service systems would be less than significant. No mitigation measures are required.

14.18 MANDATORY FINDINGS OF SIGNIFICANCE Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat or a fish or wildlife species, cause a fish or wildlife population to decrease below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered	☐	☐	☐	☒

plant or animal, or eliminate important examples of major periods of California history or prehistory?				
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?	☐	☐	☐	☒
c. Does the project have impacts which are individually limited, but cumulatively considerable (Cumulatively considerable means the projects incremental effects are considerable when compared to the past, present, and future effects of other project)?	☐	☐	☐	☒
d. Does the project have environmental effects which will have substantial adverse effects on human beings, directly or indirectly?	☐	☐	☐	☒

<u>**Impact Discussion**</u>

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat or a fish or wildlife species, cause a fish or wildlife population to decrease below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of major periods of California history or prehistory?

No Impact. The project site was mass graded sometime between 1980 and 1990 and disturbed again as part of the development of Phase 1 of the project. There is no native vegetation or habitat on the project site. Therefore, it would not reduce the habitat or fish or wildlife species, cause a fish or wildlife population to decrease below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal species. No impacts would occur.

There are no historic resources on the project site that would be impacted by the proposed project. Per City protocol, City of Oceanside staff members will contact the NAHC for a Sacred Lands File search and a list of Native American contacts and initiate AB 52 Consultation. Any avoidance measures agreed upon between the Native American contacts and the City will be implemented. Impacts would be less than significant.

b) Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?

No impact. As identified in the preceding analysis of this IS, the proposed project is consistent with the long-term goals established in the City's General Plan. These plans include land use goals including community enhancement, community development, and natural resource management goals. In addition, the project would be consistent with the City's General Plan. Therefore, impacts would be less than significant.

c) Does the project have impacts which are individually limited, but cumulatively considerable (Cumulatively considerable means the projects incremental effects are considerable when compared to the past, present, and future effects of other project)?

No impact. As identified in the preceding analysis provided in Section 15 of this IS, all project-level impacts have been determined to be less than significant or would be mitigated to a level considered less than significant. Thus, the project's impacts would be limited and its contribution to cumulative impacts would not be cumulatively considerable

d) Does the project have environmental effects which will have substantial adverse effects on human beings, directly or indirectly?

***No Impact*.** Based on the preceding analysis provided in Section 14 of this IS, implementation of the proposed project, with adherence to applicable regulatory requirements, would have no impact or less than significant impacts for the following environmental issue areas: aesthetics; agriculture and forestry resources; air quality; biological resources, cultural resources/tribal cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning; mineral resources; noise, population and housing; public services; recreation; transportation and traffic; and utilities and service systems. The proposed project would not result in environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly.

15. PREPARATION

The initial study for the subject property was prepared by:

____

Roma Stromberg, Principal Planner, Roma Environmental, LLC

16. DETERMINATION

(To be completed by the lead agency) Based on this initial evaluation:

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

[ ] I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described herein have been included in this project. A MITIGATED NEGATIVE DECLARATION will be prepared.

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

17. ENVIRONMENTAL DETERMINATION

The initial study for this project has been reviewed and the environmental determination, contained in Section V. preceding, is hereby approved:

Scott Nightingale, Senior Planner, City of Oceanside

19. REFERENCES

Bolt, Beranek & Newman

1987 Noise Control for Buildings and Manufacturing Plants, 1987

California, State of, Building Standards Commission (Building Commission)

2016 California Building Code.

California, State of, CalRecycle (CalRecycle)

2019 California's 2017 Per Capita Disposal Rate Estimate https://www.calrecycle.ca.gov/lgcentral/goalmeasure/disposalrate/mostrecent. https://www2.calrecycle.ca.gov/wastecharacterization/general/rates Websites accessed on May 7.

California, State of, Department of Conservation (DOC)

2019 California Important Farmland Finder. https://maps.conservation.ca.gov/DLRP/CIFF/. Website accessed May 7, 2019.

California, State of, Office of Environmental Health Hazard Assessment (DEH)

2015 Air Toxics Hot Spots Program Risk Assessment Guidelines.

California, State of, Department of Forestry and Fire Protection (DFF)

2009 Very High Fire Hazard Severity Zones in LRA as Recommended by CALFIRE.

California, State of, Department of Finance (DOF)

2019 E-5 Population and Housing Estimates for Cities, Counties, and the State, 2011-2019 with 2010 Census Block Benchmark. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/. Website accessed May 7, 2019.

California, State of, Governor's Office of Planning and Research (OPR)

2003 State of California General Plan Guidelines, Appendix C: Guidelines for the Preparation and Content of the Noise Element of the General Plan.

California, State of, Department of Transportation (DOT)

2013 Transportation and Construction Guidance Manual. September.

EEI Engineering Solutions (EEI)
2018 Geotechnical Evaluation for Proposed Ocean Hills Phase 2 Senior Facility Development. October 29.

Federal Highway Administration (FHWA)
2006 Roadway Construction Noise Model User's Guide.

Federal Highway Administration (FHWA)
2011 Highway Traffic Noise: Analysis and Abatement Guidance. December.

Federal Interagency Committee on Noise (FICON)
2000 Discussion of Methodologies of Measuring Noise Impact, October 22.
Federal Transit Administration (FTA)
2018 Transit Noise and Vibration Impact Assessment, May.

GeoMat Testing Laboratories, Inc. (GEOMAT)
2016 Preliminary Soil Investigation Report, Senior Living Development, Northwest of Canon Road and Mystra Way.

Institute of Traffic Engineers (ITE)
2017 Traffic Engineering Handbook.

LGC Geo-Environmental, Inc. (LGC)
2017 Phase I Environmental Site Assessment, for the Residential Development Located at 4000 Mystra Way.

Los Angeles, City of (City of LA)
2006 CEQA Thresholds Guide.

NETROnline (NETR)
2019 Historical Aerials. Accessed May 7, 2019.

Oceanside, City of, (City of Oceanside)
1974a Environmental Resource Management Element of the General Plan.
1974b Noise Element of the General Plan.
1989 Land Use Element of the General Plan.
1990 Hazardous Waste Management Element of the General Plan.
2005 Oceanside Subarea Habitat Conservation Plan/Natural Communities Conservation Plan (Subarea Plan).
2018 Municipal Code.
2019 Energy/Climate Action Element of the General Plan.
2019 Oceanside Police Department Staff. Email correspondence
2019 GIS Map Books Viewer.

Rick Engineering Company (Rick Engineering)
2018 Ocean Hills Senior Living Phase 2 Facility Focused Traffic Impact Study. November 2.

Roma Environmental, LLC (Roma Environmental)
2019a Air Quality and Greenhouse Gas Analysis Memorandum. May.

2019b Noise Impact Analysis for Ocean Hills Senior Living Facility. April 29.

San Diego County Airport Land Use Commission (SDCALUC)

2010a McClellan-Palomar Airport Land Use Compatibility Plan, as amended March 4.
Exhibit III-1 Compatibility Policy Map: Noise
Exhibit III-2 Compatibility Policy Map: Safety
Exhibit IIII-3 Compatibility Policy Map Part 77 Airspace Protection
Exhibit III-4 Compatibility Policy Map: Overflight
Exhibit III-5 Compatibility Policy Map: Airport Influence Area
Exhibit III-6 Avigation Easement and Overflight Notification Areas

2010b Oceanside Municipal Airport Land Use Compatibility Plan, January 25.
Exhibit III-1 Compatibility Policy Map: Noise
Exhibit III-2 Compatibility Policy Map: Safety
Exhibit III-3 Compatibility Policy Map Part 77 Airspace Protection
Exhibit III-4 Compatibility Policy Map: Overflight
Exhibit III-5 Compatibility Policy Map: Airport Influence Area
Exhibit III-6 Avigation Easement and Overflight Notification Areas

San Diego, County of (County of San Diego)

2018 Guidelines for Determining Significance and Report Format and Content Requirements, Air Quality.
2015 Recommended Approach to Addressing Climate Change in CEQA Documents.

University of California, Davis (UC Davis)

1997 California Department of Transportation Project-Level Carbon Monoxide Protocol (Protocol) screening procedures for CO Hotspots

Waber Consultants, Inc. (Waber Consultants)

2017 Hydrology Report for Ocean Hills ALF. October.
2019a Hydrology Report for Ocean Hills ALF-Phase II. January.
2019b Draft Storm Water Quality Management Plan for Ocean Hills ALF

APPENDIX A

Air Quality and Greenhouse Gas Memorandum

Roma Environmental, LLC

May 3, 2019

Air Quality and Greenhous Gas Memorandum
Oceanside Senior Living
18 Ventana Ridge Drive
Aliso Viejo, CA 92656

Dear Mr. Hans van der Laan:

INTRODUCTION

The firm of Roma Environmental LLC, Inc. is pleased to provide this Air Quality and Greenhouse Gas (AQ-GHG) technical memorandum for the proposed Protea Senior Living Project in the City of Oceanside.

The proposed Senior Living Facility consists of two phases. Phase 1, which is situated on the southern 3.53 acres of the site, has already been approved by the City of Oceanside; construction has been completed, and a Certificate of Occupancy has been issued by the City of Oceanside, and Phase 2 which will include construction of one new 103,004 square foot three-story building to include 102 residential dwelling units. Phase one is comprised of one 81,764 square-foot, two-story building, with 114 residential dwelling units (DU). The Phase 1 building also included a reception area, a lobby, administrative offices, a kitchen, dining rooms, a coffee bar, an ice cream bar, beauty salon, recreational rooms, patios and miscellaneous utility rooms. A small dog park was also proposed as part of Phase 1.

Fifty (50) parking stalls, including 2 electric vehicle spaces, 2 disabled access spaces, and 1 van accessible space were included in the development of Phase 1.

As Phase 1 is already complete, this AQ-GHG analysis includes an operational analysis of Phase 1 and a construction and operational analysis of Phase 2, in order to be consistent with the project-specific traffic study and also to conservatively account for the combined emissions generated from operation of both the existing Phase 1 and the proposed Phase 2.

To assist the reader with terms unique to air quality and global climate change, a definition of terms has been provided in Appendix A.

PROJECT DESCRIPTION

During the construction of Phase 1, the Applicant purchased the balance of the 6.46 acre site (2.93 acres) in order to develop an additional 102 DU for more active seniors. The intention of the proposed project is to create a mini congregate care campus for seniors to allow them to age in place. The site has an existing General Plan Land Use designation of General Commercial and is currently zoned as Limited Commercial District (CL). Surrounding land uses include single family dwellings to the north, northeast, south and southeast, and a church and a charter school to the west. The project location map is shown on Figure 1.

Phase 2 will include construction of a new 103,004 square foot three-story building and will include 102 residential DUs with 121 beds. The proposed senior living community will include a variety of resident activity and support spaces such as a lobby with reception & administrative offices, a lounge, sports bar/bistro area, media/theater room, game room, as well as a main dining, a display kitchen, laundry, offices and fitness and activity space on the first floor. Outdoor amenities include pool, spa, bocce ball court, putting green and fitness area. The entire facility will employ approximately 40 full-time and part-time members of staff working at peak times (8:00 am to 6:00 pm).

Phase 2 includes 103 parking stalls including 95 standard spaces, 4 accessible access spaces, 1 van accessible space, and 3 electrical vehicle parking spaces. It is anticipated that covered parking spaces will employ solar panels, or the building's roof will be solar ready. Landscape coverage for Phase 2 is 20 percent, approximately 31,136 square feet. Figure 2 illustrates the project site plan.

The City of Oceanside has not adopted air quality significance thresholds. The SDAPCD also does not provide specific numeric thresholds for determining the significance of air quality impacts under the CEQA Guidelines. However, the SDAPCD does specify Air Quality Impact Analysis "trigger" levels for criteria pollutant emissions associated with new or modified stationary sources (SDAPCD Rules 20.1, 20.2, and 20.3). The SDAPCD does not consider these trigger levels to represent adverse air quality impacts; rather, if these trigger levels are exceeded by stationary sources associated with a project, the SDAPCD requires an air quality analysis to determine if a significant air quality impact would occur. This analysis uses SDAPCD trigger levels shown in Table 1 as air quality impact screening levels.

SHORT-TERM AIR QUALITY CONSTRUCTION IMPACTS

Construction-related activities are temporary, short-term sources of air emissions. Sources of construction-related air emissions include:

- Fugitive dust from grading activities;
- Construction equipment exhaust;
- Construction-related trips by workers, delivery trucks, and material-hauling trucks; and
- Construction-related power consumption.

Fugitive dust emissions vary greatly during construction and are dependent on the amount and type of activity, silt content of the soil, and the weather. Vehicles moving over paved and unpaved surfaces, demolition, excavation, earth movement, grading, and wind erosion from exposed surfaces can all be sources of fugitive dust. Construction operations are subject to the requirements established in SDAPCD Regulation 4, Rules 52, 54, and 55.

An analysis of the potential short-term air quality impacts due the construction of Phase 2 of the proposed convalescent care center is provided. Construction of Phase 2 is expected to commence no sooner than October 2019 and last through approximately March 2021. Grading activities associated with Phase 2 will result in approximately 2,562 cubic yards (CY) of cut and 2,502 CY of fill. Approximately 60 CY of soil that will be exported offsite. Fine grading and infrastructure installation is anticipated to occur first and take approximately 60 days. Phases analyzed include: 1) fine grading, 2) building construction, 3) architectural coating, and 4) paving. CalEEMod output is shown in Appendix B.

Construction-Related Air Quality Impacts

The construction-related criteria pollutant emissions for the construction of the proposed Phase 2-portion of the convalescent care center are shown below in Table 2. Standard dust control measures would be implemented as a part of project construction in accordance with SDAPCD rules and regulations. Fugitive dust emissions were calculated using CalEEMod default values, and did not take into account the required dust control measures. Thus, the emissions shown in Table 2 are conservative. Table 2 shows that none of the analyzed criteria pollutants would exceed the SDAPCD screening-level thresholds. Therefore, a less than significant air quality impact would occur from construction of the project.

LONG-TERM AIR QUALITY OPERATIONAL IMPACTS

An analysis of the potential long-term air quality impacts due to operations of the entire Project (Phase 1 [existing] and Phase 2) has been completed. The operations-related criteria air quality impacts created by Phase 1 (already operational) and Phase 2 of the proposed project have been analyzed through use of the CalEEMod model. The operating emissions for Phase 1 were based on the year 2019 and year 2021 for Phase 2 (the anticipated opening year for Phase 2 of the proposed project). CalEEMod outputs for both Phases are available in Appendix B. The CalEEMod model analyzes operational emissions from area sources, energy usage, and mobile sources, which are discussed below.

A. Methodology

Mobile Sources

Mobile sources include emissions from the additional vehicle miles generated from the proposed project. The vehicle trips associated with the proposed project were based on the weekday and Sunday trip generation rates identified in the November 2018, Rick Engineering Company, *Ocean Hills Senior Living Phase 2 Facility Focused Traffic Impact Study* (TIA). Trip generation rates for Saturday were obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual 10th Edition (2017) for land use ITE 255: Continuing Care Retirement Community. The TIA analyzed Phase 1 as 114 DU with 123 beds and Phase 2 as 101 DU with 118 beds; however, per the Irwin Partners Architects (IPA) site plan for Phase 2 dated 10/18/2018, Phase 2 includes 102 DU with 121 beds. The trip generation rates in the TIA used the SANDAG *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region,* April 2002 for the weekday rates (per bed) and the ITE Trip Generation Manual 10th Edition for land use ITE 255: Continuing Care Retirement Community for the Sunday rates (per DU).

The CalEEMod model only has the option to select DUs for the land use ITE 255 Retirement Community, so the weekday trips/bed rate was converted to trips/DU. For Phase 1 this yielded a trip generation rate of 3.237 trips/DU on weekdays, 2.09 trips/DU on Saturdays and 2 trips/DU on Sundays. For Phase 2, to be conservative and ensure the analysis of the worst-case scenario, the higher number of 102 DU and 121 beds was used. Using the slightly higher values, the trip generation rate for Phase 2 weekdays calculated out to 3.559 trips/DU, 2.09 trips/DU for Saturday and 2 trips/DU for Sunday. The CalEEMod program then applies the emission factors for each trip which is provided by the EMFAC2014 model to determine the vehicular traffic pollutant emissions. CalEEMod default trip lengths were used in this analysis.

Area Sources

Area sources include emissions from hearths, consumer products, landscape equipment and architectural coatings. To be conservative, paints for the residential uses were limited to 150g/L VOC content (maximum allowable VOC content for non-flat, high-gloss coatings per SDAPCD Rule 67.0.1). No other changes were made to the default area source parameters.

Energy Usage

Energy usage includes emissions from the generation of electricity and natural gas used on-site. Project design features include solar panels on covered parking and a solar-ready roof. No changes were made to the default energy usage parameters.

B. Operational-Related Air Quality Impacts

The worst-case summer or winter VOC, NOx, CO, SO_2, PM10, and PM2.5 emissions generated by both (existing) Phase 1 and Phase 2 of the project's long-term operations have been calculated and are summarized below in Table 3. Table 3 shows that none of the analyzed criteria pollutants would exceed the established screening-level emissions thresholds for Phase 1, Phase 2 or both Phases 1 and 2 combined. Therefore, a less than significant air quality impact would occur from operation of the proposed project.

CUMULATIVE ANALYSIS

Cumulative air quality impacts may occur from a combination of the project's emissions with the emissions of other reasonably foreseeable projects and/or regional emissions. The project site is located in the San Diego Air Quality Basin and is regulated by the SDAPCD. San Diego County is currently in non-attainment for the 1-hour concentrations under the California Ambient Air Quality Standards (CAAQS) for Ozone (O_3), and for the 24-hour concentrations of PM10 under CAAQS. O_3 is formed when reactive organic gases (ROG) and nitrogen oxides react in the presence of sunlight. ROG sources include any source that burns fuels, such as gasoline, natural gas, wood and oil. Sources of PM-10 include motor vehicles, wood burning stoves and fireplaces, dust from construction, landfills, agriculture, wildfires, brush and waste burning, industrial sources, and windblown dust from open lands.

SDAPCD has established air contaminant "trigger levels" which indicate scenarios that require additional review. These "trigger levels" include 100 pounds per day for PM-10, 250 pounds per day of NOx and 550 pounds per day of CO. As shown in Tables 2 and 3, construction and operation of the project would result in an increase in PM-10, NOx and CO, but not to a level above SDAPCD's "trigger levels."

Therefore, the project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under applicable federal or state ambient air quality standards. Impacts would be less than significant.

GLOBAL CLIMATE CHANGE ANALYSIS

The proposed Project is anticipated to generate GHG emissions from operational and construction activities. The following provides the methodology used to calculate and quantify the GHG emissions and discusses the impacts.

A. Methodology

The CalEEMod Version 2016.3.2 was used to calculate the GHG emissions from the proposed Retirement Community. The City of Oceanside adopted their Final Climate Action Plan in April 2019. Therefore, the project has been compared to goals and requirements of the *Oceanside Climate Action Plan* (CAP). The CAP states on pages 4-19 to 4-21 that for "proposed land use development projects, proponents shall complete the CAP Project Review Checklist. The Project Review Checklist is designed to assess consistency with GHG reduction measures identified in Chapter 3 (of the CAP). If 'Yes' for all checklist items, then the project is considered consistent with the CAP. If 'No' for any checklist item, the project's GHG impact is significant. The project must incorporate each checklist item to the maximum extent feasible; however the project's GHG impact would remain significant."

Per the latest (January 2018) *County of San Diego Guidelines for Determining Significance, Climate Change*, there is no numerical screening level threshold of significance for GHGs, rather "a proposed project would have a less than significant cumulatively considerable contribution to climate change impacts if it is found to be consistent with the County's Climate Action Plan; and, would normally have a cumulatively considerable contribution to climate change impacts if it is found to be inconsistent with the County's Climate Action Plan." However, the project is within the boundary of the City of Oceanside and the City of Oceanside is the Lead Agency for the project; therefore, a project's consistency with the City's CAP (rather than the County CAP) would also mean that the project would have a less than significant cumulatively considerable contribution to climate change impacts.

In the interest of full disclosure and per County guidance, both the existing Phase 1 and the proposed Phase 2's GHG emissions have been quantified and each source of GHG emissions analyzed is described in greater detail below.

Area Sources
Area sources include emissions from hearths, consumer products, landscape equipment and architectural coatings. To be conservative, paints for the residential uses were limited to 150g/L VOC content (maximum allowable VOC content for non-flat, high-gloss coatings per SDAPCD Rule 67.0.1). No other changes were made to the default area source parameters.

Energy Usage
Energy usage includes emissions from the generation of electricity and natural gas used on-site. No changes were made to the default energy usage parameters.

Mobile Sources
Mobile sources include emissions from the additional vehicle miles generated from the proposed project. The vehicle trips associated with the proposed project have been analyzed in the manner as described above. The program then applies the emission factors for each trip, which is provided by the EMFAC2014 model to determine the vehicular traffic pollutant emissions. The CalEEMod default trip lengths were used in this analysis.

Waste
Waste includes the GHG emissions generated from the processing of waste from the proposed project as well as the GHG emissions from the waste once it is interred into a landfill. No changes were made to the default waste parameters.

Water
Water includes the water used for the interior of the building as well as for landscaping and is based on the GHG emissions associated with the energy used to transport and filter the water. No changes were made to the default water parameters.

Construction
The construction-related GHG emissions were also included in the analysis and were based on a 20 year amortization rate and added to the operational emissions, in accordance with City of San Diego guidance. The construction-related GHG emissions were calculated by CalEEMod in the manner detailed above.

B. Greenhouse Gas Emissions and Greenhouse Gas Plan Consistency

GHG Emissions
The GHG emissions for Phase 1 (operational only) and Phase 2 have been calculated with the CalEEMod model based on the parameters detailed above. A summary of the results is shown below in Table 4 and CalEEMod model run for the proposed project is provided in Appendix C.

The data provided in Table 4 shows that for Phase 1 (existing), the operational GHG emissions would be 728.75 MTCO2e/year. For Phase 2, the proposed project's emissions would be 687.37 $MTCO_2e$ per year. Phase 1 and Phase 2 have a combined total of 1,416.12 MTCO2e/year. These emissions do not include reductions from any design features, location-based efficiencies, or regulatory requirements beyond 2016 Title 24 Standards.

CAP Consistency
The proposed project could have the potential to conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases. As detailed above, the applicable plan for the proposed project is the *Oceanside Climate Action*

Plan, which was approved by the City in April 2019. The CAP's Project Review Checklist (see Appendix C for details) is divided into seven areas: Smart Growth, Alternative-Fueled Vehicle Infrastructure, Alternative-Fuel Vehicle Parking, Transportation Demand Management, Energy Efficiency, Recycled Water and Tree Canopy. The proposed project's consistency with the Project Review Checklist from the City's CAP is examined in Table 5. As shown in Table 5, the project is found is to be consistent with the City's CAP for all applicable Checklist Items.

SB-32

SB-32 requires the state board to ensure that statewide greenhouse gas emissions are reduced to 40% below the 1990 level by 2030.

The City's CAP outlines measures the Oceanside community will take to make progress towards meeting the State of California's 2050 GHG reduction goal. Therefore, projects that are consistent with the CAP, would also be on track to meet the SB-32 reduction targets for 2030. Furthermore, most of the post 2020 reductions in GHG emissions are addressed via regulatory requirements at the State level and the project will be required to comply with these regulations as they come into effect.

GHG Plan Consistency Conclusion

The project is consistent with the City's CAP; therefore, the proposed project would have a less than significant cumulatively considerable contribution to climate change impacts and would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases. Impacts are considered to be less than significant.

CONCLUSIONS

As discussed above, the proposed project would not exceed SDAPCD screening thresholds for construction-related emissions or operational emissions. Furthermore, the project is in compliance with the City Oceanside Climate Action Plan. Therefore, this technical memorandum found that air quality and greenhouse gas-related impacts are considered to be less than significant.

It has been a pleasure to service your needs on this project. Should you have any questions or if we can be of further assistance, please do not hesitate to call at (951) 212-3277 or (951) 544-3170.

Sincerely,

Katie Wilson

Katie Wilson, M.S., Senior Air Quality Analyst

Roma Stromberg, M.S. INCE Principal

APPENDIX A

Glossary of Terms

AQMP	Air Quality Management Plan
CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH4	Methane
CNG	Compressed natural gas
CO	Carbon monoxide
CO_2	Carbon dioxide
CO2e	Carbon dioxide equivalent
DPM	Diesel particulate matter
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse gas
GWP	Global warming potential
HFCs	Hydrofluorocarbons
IPCC	International Panel on Climate Change
LST	Localized Significant Thresholds
$MTCO_2e$	Metric tons of carbon dioxide equivalent
$MMTCO_2e$	Million metric tons of carbon dioxide equivalent
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NOx	Nitrogen Oxides
NO_2	Nitrogen dioxide
N_2O	Nitrous oxide
O_3	Ozone
OPR	Governor’s Office of Planning and Research
PFCs	Perfluorocarbons
PM	Particle matter
PM10	Particles that are less than 10 micrometers in diameter
PM2.5	Particles that are less than 2.5 micrometers in diameter
PMI	Point of maximum impact
PPB	Parts per billion
PPM	Parts per million
RTIP	Regional Transportation Improvement Plan
RTP	Regional Transportation Plan
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SF_6	Sulfur hexafluoride

SIP	State Implementation Plan
SOx	Sulfur Oxides
TAC	Toxic air contaminants
UNFCC	United Nations Framework Convention on Climate Change
VOC	Volatile organic compounds
WARM	Waste Reduction Model

APPENDIX B

CalEEMod Model Daily Emissions Printouts

Ocean Hills Part I OPS ONLY

San Diego County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	50.00	Space	0.45	20,000.00	0
Retirement Community	114.00	Dwelling Unit	3.08	81,764.00	123

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2019
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase I = 114 DU retirement community with 123 beds and a 50-space parking lot on 3.53 ac.

Construction Phase - No construction. Operational analysis only.

Vehicle Trips - Per TIA for phase I, Weekday = 369 trips day => 3.237 trips/DU for 114 units; Sat = 2.09 trips/DU, Sun = 2 trips/DU (Sat and Sun from ITE 10th Ed for landuse 255 Retirement Community)
Area Coating - 150g/L standard

Woodstoves - No woodstoves or fireplaces.

Table Name	Column Name	Default Value	New Value

tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	150
tblFireplaces	NumberGas	62.70	0.00
tblFireplaces	NumberWood	39.90	0.00
tblLandUse	LandUseSquareFeet	114,000.00	81,764.00
tblLandUse	LotAcreage	22.80	3.08
tblLandUse	Population	326.00	123.00
tblVehicleTrips	ST_TR	2.03	2.09
tblVehicleTrips	SU_TR	1.95	2.00
tblVehicleTrips	WD_TR	2.40	3.24
tblWoodstoves	NumberCatalytic	5.70	0.00
tblWoodstoves	NumberNoncatalytic	5.70	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.4710	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518	0.0000	16.9459	16.9459	0.0167	0.0000	17.3622
Energy	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268
Mobile	0.7681	3.1547	8.9996	0.0283	2.2367	0.0308	2.2675	0.5979	0.0290	0.6269		2,863.6347	2,863.6347	0.1559		2,867.5312
Total	**3.2769**	**3.5874**	**18.5940**	**0.0308**	**2.2367**	**0.1087**	**2.3454**	**0.5979**	**0.1069**	**0.7048**	**0.0000**	**3,293.0563**	**3,293.0563**	**0.1804**	**7.5600e-003**	**3,299.8203**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.4710	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518	0.0000	16.9459	16.9459	0.0167	0.0000	17.3622
Energy	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268
Mobile	0.7681	3.1547	8.9996	0.0283	2.2367	0.0308	2.2675	0.5979	0.0290	0.6269		2,863.6347	2,863.6347	0.1559		2,867.5312
Total	**3.2769**	**3.5874**	**18.5940**	**0.0308**	**2.2367**	**0.1087**	**2.3454**	**0.5979**	**0.1069**	**0.7048**	**0.0000**	**3,293.0563**	**3,293.0563**	**0.1804**	**7.5600e-003**	**3,299.8203**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.7681	3.1547	8.9996	0.0283	2.2367	0.0308	2.2675	0.5979	0.0290	0.6269		2,863.6347	2,863.6347	0.1559		2,867.5312
Unmitigated	0.7681	3.1547	8.9996	0.0283	2.2367	0.0308	2.2675	0.5979	0.0290	0.6269		2,863.6347	2,863.6347	0.1559		2,867.5312

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Retirement Community	369.36	238.26	228.00	943,498	943,498
Total	369.36	238.26	228.00	943,498	943,498

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Retirement Community	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Retirement Community	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268
NaturalGas Unmitigated	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	3506.04	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268
Total		**0.0378**	**0.3231**	**0.1375**	**2.0600e-003**		**0.0261**	**0.0261**		**0.0261**	**0.0261**		**412.4757**	**412.4757**	**7.9100e-003**	**7.5600e-003**	**414.9268**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	3.50604	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268
Total		**0.0378**	**0.3231**	**0.1375**	**2.0600e-003**		**0.0261**	**0.0261**		**0.0261**	**0.0261**		**412.4757**	**412.4757**	**7.9100e-003**	**7.5600e-003**	**414.9268**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.4710	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518	0.0000	16.9459	16.9459	0.0167	0.0000	17.3622
Unmitigated	2.4710	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518	0.0000	16.9459	16.9459	0.0167	0.0000	17.3622

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4243					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.7568					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2898	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518		16.9459	16.9459	0.0167		17.3622
Total	**2.4710**	**0.1095**	**9.4569**	**5.0000e-004**		**0.0518**	**0.0518**		**0.0518**	**0.0518**	**0.0000**	**16.9459**	**16.9459**	**0.0167**	**0.0000**	**17.3622**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4243					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.7568					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2898	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518		16.9459	16.9459	0.0167		17.3622
Total	**2.4710**	**0.1095**	**9.4569**	**5.0000e-004**		**0.0518**	**0.0518**		**0.0518**	**0.0518**	**0.0000**	**16.9459**	**16.9459**	**0.0167**	**0.0000**	**17.3622**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Ocean Hills Part I OPS ONLY

San Diego County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	50.00	Space	0.45	20,000.00	0
Retirement Community	114.00	Dwelling Unit	3.08	81,764.00	123

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2019
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase I = 114 DU retirement community with 123 beds and a 50-space parking lot on 3.53 ac.

Construction Phase - No construction. Operational analysis only.

Vehicle Trips - Per TIA for phase I, Weekday = 369 trips day => 3.237 trips/DU for 114 units; Sat = 2.09 trips/DU, Sun = 2 trips/DU (Sat and Sun from ITE 10th Ed for landuse 255 Retirement Community)

Area Coating - 150g/L standard

Woodstoves - No woodstoves or fireplaces.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	150
tblFireplaces	NumberGas	62.70	0.00
tblFireplaces	NumberWood	39.90	0.00
tblLandUse	LandUseSquareFeet	114,000.00	81,764.00
tblLandUse	LotAcreage	22.80	3.08
tblLandUse	Population	326.00	123.00
tblVehicleTrips	ST_TR	2.03	2.09
tblVehicleTrips	SU_TR	1.95	2.00
tblVehicleTrips	WD_TR	2.40	3.24
tblWoodstoves	NumberCatalytic	5.70	0.00
tblWoodstoves	NumberNoncatalytic	5.70	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.4710	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518	0.0000	16.9459	16.9459	0.0167	0.0000	17.3622
Energy	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268
Mobile	0.7494	3.2580	8.8718	0.0268	2.2367	0.0310	2.2678	0.5979	0.0292	0.6271		2,715.0971	2,715.0971	0.1562		2,719.0025
Total	**3.2582**	**3.6906**	**18.4661**	**0.0294**	**2.2367**	**0.1090**	**2.3457**	**0.5979**	**0.1071**	**0.7051**	**0.0000**	**3,144.5187**	**3,144.5187**	**0.1808**	**7.5600e-003**	**3,151.2916**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.4710	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518	0.0000	16.9459	16.9459	0.0167	0.0000	17.3622
Energy	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268
Mobile	0.7494	3.2580	8.8718	0.0268	2.2367	0.0310	2.2678	0.5979	0.0292	0.6271		2,715.0971	2,715.0971	0.1562		2,719.0025
Total	**3.2582**	**3.6906**	**18.4661**	**0.0294**	**2.2367**	**0.1090**	**2.3457**	**0.5979**	**0.1071**	**0.7051**	**0.0000**	**3,144.5187**	**3,144.5187**	**0.1808**	**7.5600e-003**	**3,151.2916**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.7494	3.2580	8.8718	0.0268	2.2367	0.0310	2.2678	0.5979	0.0292	0.6271		2,715.0971	2,715.0971	0.1562		2,719.0025
Unmitigated	0.7494	3.2580	8.8718	0.0268	2.2367	0.0310	2.2678	0.5979	0.0292	0.6271		2,715.0971	2,715.0971	0.1562		2,719.0025

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Retirement Community	369.36	238.26	228.00	943,498	943,498
Total	369.36	238.26	228.00	943,498	943,498

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Retirement Community	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Retirement Community	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268

NaturalGas Unmitigated	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	3506.04	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268
Total		**0.0378**	**0.3231**	**0.1375**	**2.0600e-003**		**0.0261**	**0.0261**		**0.0261**	**0.0261**		**412.4757**	**412.4757**	**7.9100e-003**	**7.5600e-003**	**414.9268**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	3.50604	0.0378	0.3231	0.1375	2.0600e-003		0.0261	0.0261		0.0261	0.0261		412.4757	412.4757	7.9100e-003	7.5600e-003	414.9268
Total		**0.0378**	**0.3231**	**0.1375**	**2.0600e-003**		**0.0261**	**0.0261**		**0.0261**	**0.0261**		**412.4757**	**412.4757**	**7.9100e-003**	**7.5600e-003**	**414.9268**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.4710	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518	0.0000	16.9459	16.9459	0.0167	0.0000	17.3622
Unmitigated	2.4710	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518	0.0000	16.9459	16.9459	0.0167	0.0000	17.3622

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4243					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.7568					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2898	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518		16.9459	16.9459	0.0167		17.3622
Total	**2.4710**	**0.1095**	**9.4569**	**5.0000e-004**		**0.0518**	**0.0518**		**0.0518**	**0.0518**	**0.0000**	**16.9459**	**16.9459**	**0.0167**	**0.0000**	**17.3622**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.4243					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.7568					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2898	0.1095	9.4569	5.0000e-004		0.0518	0.0518		0.0518	0.0518		16.9459	16.9459	0.0167		17.3622
Total	**2.4710**	**0.1095**	**9.4569**	**5.0000e-004**		**0.0518**	**0.0518**		**0.0518**	**0.0518**	**0.0000**	**16.9459**	**16.9459**	**0.0167**	**0.0000**	**17.3622**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Ocean Hills Phase II

San Diego County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	103.00	Space	0.93	41,200.00	0
Retirement Community	102.00	Dwelling Unit	2.00	103,004.00	121

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2021
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase II = 102 DU, 121 beds in a 103,004 SF building, a 103-space parking lot on 2.93 ac.

Construction Phase - Site already mass graded. Construction starts ~Oct 2019 and continue until ~March 2021. Grading and infrastructure to take ~60 days.

Trips and VMT -

Grading - 2,562 CY cut and 2,502 CY of fill = 60 CY of export

Architectural Coating - 150 g/L standard

Vehicle Trips - Trip generation per TIA = 3.559 trips/DU weekday; 2.09 trips/DU Sat and 2 trips/DU Sun.

Area Coating - 150g/L standard

Construction Off-road Equipment Mitigation -

Woodstoves - No woodstoves or fireplaces

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	150.00
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	150
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	NumDays	220.00	260.00
tblConstructionPhase	NumDays	6.00	60.00
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	PhaseEndDate	9/8/2020	3/13/2020
tblConstructionPhase	PhaseEndDate	8/11/2020	12/21/2020
tblConstructionPhase	PhaseEndDate	10/8/2019	12/23/2019
tblConstructionPhase	PhaseEndDate	8/25/2020	2/1/2021
tblConstructionPhase	PhaseStartDate	8/26/2020	2/2/2020
tblConstructionPhase	PhaseStartDate	10/9/2019	12/24/2019
tblConstructionPhase	PhaseStartDate	8/12/2020	12/22/2020

tblFireplaces	NumberGas	56.10	0.00
tblFireplaces	NumberWood	35.70	0.00
tblGrading	MaterialExported	0.00	60.00
tblLandUse	LandUseSquareFeet	102,000.00	103,004.00
tblLandUse	LotAcreage	20.40	2.00
tblLandUse	Population	292.00	121.00
tblVehicleTrips	HO_TTP	39.60	40.00
tblVehicleTrips	HS_TTP	18.80	18.00
tblVehicleTrips	HW_TTP	41.60	42.00
tblVehicleTrips	ST_TR	2.03	2.09
tblVehicleTrips	SU_TR	1.95	2.00
tblVehicleTrips	WD_TR	2.40	3.56
tblWoodstoves	NumberCatalytic	5.10	0.00
tblWoodstoves	NumberNoncatalytic	5.10	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	2.9982	22.8119	18.6463	0.0379	6.6370	1.1110	7.7107	3.3899	1.0647	4.3777	0.0000	3,636.857 1	3,636.857 1	0.6496	0.0000	3,650.542 7
2020	68.4043	21.4166	20.3354	0.0421	1.0173	1.0753	2.0926	0.2726	1.0351	1.3077	0.0000	4,018.202 2	4,018.202 2	0.5528	0.0000	4,032.022 5
2021	1.1964	10.6815	12.1735	0.0191	0.1232	0.5834	0.7067	0.0327	0.5379	0.5706	0.0000	1,831.276 8	1,831.276 8	0.5452	0.0000	1,844.905 7
Maximum	**68.4043**	**22.8119**	**20.3354**	**0.0421**	**6.6370**	**1.1110**	**7.7107**	**3.3899**	**1.0647**	**4.3777**	**0.0000**	**4,018.202 2**	**4,018.202 2**	**0.6496**	**0.0000**	**4,032.022 5**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	2.9982	22.8119	18.6463	0.0379	6.6370	1.1110	7.7107	3.3899	1.0647	4.3777	0.0000	3,636.857 1	3,636.857 1	0.6496	0.0000	3,650.542 7
2020	68.4043	21.4166	20.3354	0.0421	1.0173	1.0753	2.0926	0.2726	1.0351	1.3077	0.0000	4,018.202 2	4,018.202 2	0.5528	0.0000	4,032.022 5
2021	1.1964	10.6815	12.1735	0.0191	0.1232	0.5834	0.7067	0.0327	0.5379	0.5706	0.0000	1,831.276 8	1,831.276 8	0.5452	0.0000	1,844.905 7
Maximum	**68.4043**	**22.8119**	**20.3354**	**0.0421**	**6.6370**	**1.1110**	**7.7107**	**3.3899**	**1.0647**	**4.3777**	**0.0000**	**4,018.202 2**	**4,018.202 2**	**0.6496**	**0.0000**	**4,032.022 5**

Ocean Hills Phase II - San Diego County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.0130	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465	0.0000	15.1749	15.1749	0.0147	0.0000	15.5435
Energy	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503
Mobile	0.6431	2.6299	7.6134	0.0262	2.2022	0.0213	2.2235	0.5886	0.0199	0.6085		2,660.4839	2,660.4839	0.1361		2,663.8868
Total	**3.6899**	**3.0164**	**16.1804**	**0.0285**	**2.2022**	**0.0912**	**2.2934**	**0.5886**	**0.0898**	**0.6784**	**0.0000**	**3,044.7160**	**3,044.7160**	**0.1579**	**6.7700e-003**	**3,050.6806**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.0130	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465	0.0000	15.1749	15.1749	0.0147	0.0000	15.5435
Energy	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503
Mobile	0.6431	2.6299	7.6134	0.0262	2.2022	0.0213	2.2235	0.5886	0.0199	0.6085		2,660.4839	2,660.4839	0.1361		2,663.8868
Total	**3.6899**	**3.0164**	**16.1804**	**0.0285**	**2.2022**	**0.0912**	**2.2934**	**0.5886**	**0.0898**	**0.6784**	**0.0000**	**3,044.7160**	**3,044.7160**	**0.1579**	**6.7700e-003**	**3,050.6806**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Fine Grading	Grading	10/1/2019	12/23/2019	5	60	
2	Building Construction	Building Construction	12/24/2019	12/21/2020	5	260	
3	Paving	Paving	12/22/2020	2/1/2021	5	30	
4	Architectural Coating	Architectural Coating	2/2/2020	3/13/2020	5	30	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.93

Residential Indoor: 208,583; Residential Outdoor: 69,528; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 2,472 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Fine Grading	Graders	1	8.00	187	0.41
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Fine Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Fine Grading	4	10.00	0.00	8.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	91.00	18.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Fine Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5525	0.0000	6.5525	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	2.0287	22.7444	10.1518	0.0206		1.0730	1.0730		0.9871	0.9871		2,041.2539	2,041.2539	0.6458		2,057.3997
Total	**2.0287**	**22.7444**	**10.1518**	**0.0206**	**6.5525**	**1.0730**	**7.6255**	**3.3675**	**0.9871**	**4.3546**		**2,041.2539**	**2,041.2539**	**0.6458**		**2,057.3997**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.1600e-003	0.0401	8.6500e-003	1.1000e-004	2.3300e-003	1.5000e-004	2.4800e-003	6.4000e-004	1.4000e-004	7.8000e-004		11.5396	11.5396	1.0200e-003		11.5652
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0393	0.0274	0.3094	8.7000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.4000e-004	0.0223		87.0200	87.0200	2.7800e-003		87.0894
Total	**0.0404**	**0.0675**	**0.3181**	**9.8000e-004**	**0.0845**	**7.4000e-004**	**0.0852**	**0.0224**	**6.8000e-004**	**0.0231**		**98.5596**	**98.5596**	**3.8000e-003**		**98.6546**

3.2 Fine Grading - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5525	0.0000	6.5525	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	2.0287	22.7444	10.1518	0.0206		1.0730	1.0730		0.9871	0.9871	0.0000	2,041.2539	2,041.2539	0.6458		2,057.3997
Total	**2.0287**	**22.7444**	**10.1518**	**0.0206**	**6.5525**	**1.0730**	**7.6255**	**3.3675**	**0.9871**	**4.3546**	**0.0000**	**2,041.2539**	**2,041.2539**	**0.6458**		**2,057.3997**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.1600e-003	0.0401	8.6500e-003	1.1000e-004	2.3300e-003	1.5000e-004	2.4800e-003	6.4000e-004	1.4000e-004	7.8000e-004		11.5396	11.5396	1.0200e-003		11.5652
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0393	0.0274	0.3094	8.7000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.4000e-004	0.0223		87.0200	87.0200	2.7800e-003		87.0894
Total	**0.0404**	**0.0675**	**0.3181**	**9.8000e-004**	**0.0845**	**7.4000e-004**	**0.0852**	**0.0224**	**6.8000e-004**	**0.0231**		**98.5596**	**98.5596**	**3.8000e-003**		**98.6546**

3.3 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.5581	18.9103	15.2545	0.0250		1.0901	1.0901		1.0449	1.0449		2,312.1454	2,312.1454	0.4810		2,324.1705
Total	**2.5581**	**18.9103**	**15.2545**	**0.0250**		**1.0901**	**1.0901**		**1.0449**	**1.0449**		**2,312.1454**	**2,312.1454**	**0.4810**		**2,324.1705**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0829	2.2318	0.5762	4.9700e-003	0.1219	0.0155	0.1374	0.0351	0.0149	0.0499		532.8299	532.8299	0.0411		533.8584
Worker	0.3573	0.2494	2.8157	7.9500e-003	0.7475	5.3300e-003	0.7529	0.1983	4.9100e-003	0.2032		791.8817	791.8817	0.0253		792.5138
Total	**0.4402**	**2.4811**	**3.3918**	**0.0129**	**0.8694**	**0.0209**	**0.8903**	**0.2334**	**0.0198**	**0.2531**		**1,324.7116**	**1,324.7116**	**0.0664**		**1,326.3722**

3.3 Building Construction - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.5581	18.9103	15.2545	0.0250		1.0901	1.0901		1.0449	1.0449	0.0000	2,312.1454	2,312.1454	0.4810		2,324.1705
Total	**2.5581**	**18.9103**	**15.2545**	**0.0250**		**1.0901**	**1.0901**		**1.0449**	**1.0449**	**0.0000**	**2,312.1454**	**2,312.1454**	**0.4810**		**2,324.1705**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0829	2.2318	0.5762	4.9700e-003	0.1219	0.0155	0.1374	0.0351	0.0149	0.0499		532.8299	532.8299	0.0411		533.8584
Worker	0.3573	0.2494	2.8157	7.9500e-003	0.7475	5.3300e-003	0.7529	0.1983	4.9100e-003	0.2032		791.8817	791.8817	0.0253		792.5138
Total	**0.4402**	**2.4811**	**3.3918**	**0.0129**	**0.8694**	**0.0209**	**0.8903**	**0.2334**	**0.0198**	**0.2531**		**1,324.7116**	**1,324.7116**	**0.0664**		**1,326.3722**

3.3 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2879	17.4336	14.8972	0.0250		0.9482	0.9482		0.9089	0.9089		2,288.8877	2,288.8877	0.4646		2,300.5014
Total	**2.2879**	**17.4336**	**14.8972**	**0.0250**		**0.9482**	**0.9482**		**0.9089**	**0.9089**		**2,288.8877**	**2,288.8877**	**0.4646**		**2,300.5014**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0673	2.0297	0.5171	4.9300e-003	0.1219	9.9300e-003	0.1318	0.0351	9.5000e-003	0.0446		529.2722	529.2722	0.0390		530.2483
Worker	0.3339	0.2250	2.5795	7.7000e-003	0.7475	5.2500e-003	0.7528	0.1983	4.8300e-003	0.2031		766.8998	766.8998	0.0229		767.4723
Total	**0.4012**	**2.2546**	**3.0966**	**0.0126**	**0.8694**	**0.0152**	**0.8846**	**0.2334**	**0.0143**	**0.2477**		**1,296.1720**	**1,296.1720**	**0.0619**		**1,297.7206**

3.3 Building Construction - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2879	17.4336	14.8972	0.0250		0.9482	0.9482		0.9089	0.9089	0.0000	2,288.8877	2,288.8877	0.4646		2,300.5014
Total	**2.2879**	**17.4336**	**14.8972**	**0.0250**		**0.9482**	**0.9482**		**0.9089**	**0.9089**	**0.0000**	**2,288.8877**	**2,288.8877**	**0.4646**		**2,300.5014**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0673	2.0297	0.5171	4.9300e-003	0.1219	9.9300e-003	0.1318	0.0351	9.5000e-003	0.0446		529.2722	529.2722	0.0390		530.2483
Worker	0.3339	0.2250	2.5795	7.7000e-003	0.7475	5.2500e-003	0.7528	0.1983	4.8300e-003	0.2031		766.8998	766.8998	0.0229		767.4723
Total	**0.4012**	**2.2546**	**3.0966**	**0.0126**	**0.8694**	**0.0152**	**0.8846**	**0.2334**	**0.0143**	**0.2477**		**1,296.1720**	**1,296.1720**	**0.0619**		**1,297.7206**

3.4 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1547	11.5873	11.8076	0.0178		0.6565	0.6565		0.6051	0.6051		1,709.2180	1,709.2180	0.5417		1,722.7605
Paving	0.0812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2359**	**11.5873**	**11.8076**	**0.0178**		**0.6565**	**0.6565**		**0.6051**	**0.6051**		**1,709.2180**	**1,709.2180**	**0.5417**		**1,722.7605**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0550	0.0371	0.4252	1.2700e-003	0.1232	8.6000e-004	0.1241	0.0327	8.0000e-004	0.0335		126.4121	126.4121	3.7700e-003		126.5064
Total	**0.0550**	**0.0371**	**0.4252**	**1.2700e-003**	**0.1232**	**8.6000e-004**	**0.1241**	**0.0327**	**8.0000e-004**	**0.0335**		**126.4121**	**126.4121**	**3.7700e-003**		**126.5064**

3.4 Paving - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Off-Road	1.1547	11.5873	11.8076	0.0178		0.6565	0.6565		0.6051	0.6051	0.0000	1,709.218 0	1,709.218 0	0.5417		1,722.760 5
Paving	0.0812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2359**	**11.5873**	**11.8076**	**0.0178**		**0.6565**	**0.6565**		**0.6051**	**0.6051**	**0.0000**	**1,709.218 0**	**1,709.218 0**	**0.5417**		**1,722.760 5**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0550	0.0371	0.4252	1.2700e-003	0.1232	8.6000e-004	0.1241	0.0327	8.0000e-004	0.0335		126.4121	126.4121	3.7700e-003		126.5064
Total	**0.0550**	**0.0371**	**0.4252**	**1.2700e-003**	**0.1232**	**8.6000e-004**	**0.1241**	**0.0327**	**8.0000e-004**	**0.0335**		**126.4121**	**126.4121**	**3.7700e-003**		**126.5064**

3.4 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0633	10.6478	11.7756	0.0178		0.5826	0.5826		0.5371	0.5371		1,709.1107	1,709.1107	0.5417		1,722.652 4
Paving	0.0812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1445**	**10.6478**	**11.7756**	**0.0178**		**0.5826**	**0.5826**		**0.5371**	**0.5371**		**1,709.110 7**	**1,709.110 7**	**0.5417**		**1,722.652 4**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0519	0.0337	0.3979	1.2300e-003	0.1232	8.5000e-004	0.1241	0.0327	7.8000e-004	0.0335		122.1661	122.1661	3.4900e-003		122.2533
Total	**0.0519**	**0.0337**	**0.3979**	**1.2300e-003**	**0.1232**	**8.5000e-004**	**0.1241**	**0.0327**	**7.8000e-004**	**0.0335**		**122.1661**	**122.1661**	**3.4900e-003**		**122.2533**

3.4 Paving - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0633	10.6478	11.7756	0.0178		0.5826	0.5826		0.5371	0.5371	0.0000	1,709.1107	1,709.1107	0.5417		1,722.652 4
Paving	0.0812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1445**	**10.6478**	**11.7756**	**0.0178**		**0.5826**	**0.5826**		**0.5371**	**0.5371**	**0.0000**	**1,709.110 7**	**1,709.110 7**	**0.5417**		**1,722.652 4**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0519	0.0337	0.3979	1.2300e-003	0.1232	8.5000e-004	0.1241	0.0327	7.8000e-004	0.0335		122.1661	122.1661	3.4900e-003		122.2533
Total	**0.0519**	**0.0337**	**0.3979**	**1.2300e-003**	**0.1232**	**8.5000e-004**	**0.1241**	**0.0327**	**7.8000e-004**	**0.0335**		**122.1661**	**122.1661**	**3.4900e-003**		**122.2533**

3.5 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.4070					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**65.6492**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0661	0.0445	0.5102	1.5200e-003	0.1479	1.0400e-003	0.1489	0.0392	9.6000e-004	0.0402		151.6945	151.6945	4.5300e-003		151.8077
Total	**0.0661**	**0.0445**	**0.5102**	**1.5200e-003**	**0.1479**	**1.0400e-003**	**0.1489**	**0.0392**	**9.6000e-004**	**0.0402**		**151.6945**	**151.6945**	**4.5300e-003**		**151.8077**

3.5 Architectural Coating - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.4070					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**65.6492**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0661	0.0445	0.5102	1.5200e-003	0.1479	1.0400e-003	0.1489	0.0392	9.6000e-004	0.0402		151.6945	151.6945	4.5300e-003		151.8077
Total	**0.0661**	**0.0445**	**0.5102**	**1.5200e-003**	**0.1479**	**1.0400e-003**	**0.1489**	**0.0392**	**9.6000e-004**	**0.0402**		**151.6945**	**151.6945**	**4.5300e-003**		**151.8077**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.6431	2.6299	7.6134	0.0262	2.2022	0.0213	2.2235	0.5886	0.0199	0.6085		2,660.4839	2,660.4839	0.1361		2,663.8868
Unmitigated	0.6431	2.6299	7.6134	0.0262	2.2022	0.0213	2.2235	0.5886	0.0199	0.6085		2,660.4839	2,660.4839	0.1361		2,663.8868

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Retirement Community	363.12	213.18	204.00	912,277	912,277
Total	363.12	213.18	204.00	912,277	912,277

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Retirement Community	10.80	7.30	7.50	42.00	18.00	40.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Retirement Community	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503
NaturalGas Unmitigated	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	3136.99	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503
Total		**0.0338**	**0.2891**	**0.1230**	**1.8500e-003**		**0.0234**	**0.0234**		**0.0234**	**0.0234**		**369.0572**	**369.0572**	**7.0700e-003**	**6.7700e-003**	**371.2503**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	3.13699	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503
Total		**0.0338**	**0.2891**	**0.1230**	**1.8500e-003**		**0.0234**	**0.0234**		**0.0234**	**0.0234**		**369.0572**	**369.0572**	**7.0700e-003**	**6.7700e-003**	**371.2503**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.0130	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465	0.0000	15.1749	15.1749	0.0147	0.0000	15.5435
Unmitigated	3.0130	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465	0.0000	15.1749	15.1749	0.0147	0.0000	15.5435

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5376					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.2189					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2565	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465		15.1749	15.1749	0.0147		15.5435
Total	**3.0130**	**0.0975**	**8.4440**	**4.5000e-004**		**0.0465**	**0.0465**		**0.0465**	**0.0465**	**0.0000**	**15.1749**	**15.1749**	**0.0147**	**0.0000**	**15.5435**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5376					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.2189					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2565	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465		15.1749	15.1749	0.0147		15.5435
Total	**3.0130**	**0.0975**	**8.4440**	**4.5000e-004**		**0.0465**	**0.0465**		**0.0465**	**0.0465**	**0.0000**	**15.1749**	**15.1749**	**0.0147**	**0.0000**	**15.5435**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Ocean Hills Phase II

San Diego County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	103.00	Space	0.93	41,200.00	0
Retirement Community	102.00	Dwelling Unit	2.00	103,004.00	121

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2021
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Ocean Hills Phase II - San Diego County, Winter

Project Characteristics -

Land Use - Phase II = 102 DU, 121 beds in a 103,004 SF building, a 103-space parking lot on 2.93 ac.

Construction Phase - Site already mass graded. Construction starts ~Oct 2019 and continue until ~March 2021. Grading and infrastructure to take ~60 days.

Trips and VMT -

Grading - 2,562 CY cut and 2,502 CY of fill = 60 CY of export

Architectural Coating - 150 g/L standard

Vehicle Trips - Trip generation per TIA = 3.559 trips/DU weekday; 2.09 trips/DU Sat and 2 trips/DU Sun.

Area Coating - 150g/L standard

Construction Off-road Equipment Mitigation -

Woodstoves - No woodstoves or fireplaces

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	150.00
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	150
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	NumDays	220.00	260.00
tblConstructionPhase	NumDays	6.00	60.00
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	PhaseEndDate	9/8/2020	3/13/2020
tblConstructionPhase	PhaseEndDate	8/11/2020	12/21/2020
tblConstructionPhase	PhaseEndDate	10/8/2019	12/23/2019
tblConstructionPhase	PhaseEndDate	8/25/2020	2/1/2021
tblConstructionPhase	PhaseStartDate	8/26/2020	2/2/2020
tblConstructionPhase	PhaseStartDate	10/9/2019	12/24/2019
tblConstructionPhase	PhaseStartDate	8/12/2020	12/22/2020

tblFireplaces	NumberGas	56.10	0.00
tblFireplaces	NumberWood	35.70	0.00
tblGrading	MaterialExported	0.00	60.00
tblLandUse	LandUseSquareFeet	102,000.00	103,004.00
tblLandUse	LotAcreage	20.40	2.00
tblLandUse	Population	292.00	121.00
tblVehicleTrips	HO_TTP	39.60	40.00
tblVehicleTrips	HS_TTP	18.80	18.00
tblVehicleTrips	HW_TTP	41.60	42.00
tblVehicleTrips	ST_TR	2.03	2.09
tblVehicleTrips	SU_TR	1.95	2.00
tblVehicleTrips	WD_TR	2.40	3.56
tblWoodstoves	NumberCatalytic	5.10	0.00
tblWoodstoves	NumberNoncatalytic	5.10	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	3.0486	22.8156	18.5541	0.0373	6.6370	1.1113	7.7107	3.3899	1.0650	4.3778	0.0000	3,574.8374	3,574.8374	0.6495	0.0000	3,588.5562
2020	68.4605	21.4481	20.2154	0.0414	1.0173	1.0755	2.0928	0.2726	1.0353	1.3079	0.0000	3,948.3016	3,948.3016	0.5538	0.0000	3,962.1464
2021	1.2034	10.6856	12.1496	0.0190	0.1232	0.5834	0.7067	0.0327	0.5379	0.5706	0.0000	1,823.7929	1,823.7929	0.5450	0.0000	1,837.4169
Maximum	**68.4605**	**22.8156**	**20.2154**	**0.0414**	**6.6370**	**1.1113**	**7.7107**	**3.3899**	**1.0650**	**4.3778**	**0.0000**	**3,948.3016**	**3,948.3016**	**0.6495**	**0.0000**	**3,962.1464**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	3.0486	22.8156	18.5541	0.0373	6.6370	1.1113	7.7107	3.3899	1.0650	4.3778	0.0000	3,574.8374	3,574.8374	0.6495	0.0000	3,588.5562
2020	68.4605	21.4481	20.2154	0.0414	1.0173	1.0755	2.0928	0.2726	1.0353	1.3079	0.0000	3,948.3016	3,948.3016	0.5538	0.0000	3,962.1464
2021	1.2034	10.6856	12.1496	0.0190	0.1232	0.5834	0.7067	0.0327	0.5379	0.5706	0.0000	1,823.7928	1,823.7928	0.5450	0.0000	1,837.4169
Maximum	**68.4605**	**22.8156**	**20.2154**	**0.0414**	**6.6370**	**1.1113**	**7.7107**	**3.3899**	**1.0650**	**4.3778**	**0.0000**	**3,948.3016**	**3,948.3016**	**0.6495**	**0.0000**	**3,962.1464**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.0130	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465	0.0000	15.1749	15.1749	0.0147	0.0000	15.5435
Energy	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503
Mobile	0.6245	2.7072	7.4705	0.0248	2.2022	0.0214	2.2236	0.5886	0.0200	0.6086		2,523.3049	2,523.3049	0.1365		2,526.7173
Total	**3.6713**	**3.0937**	**16.0375**	**0.0271**	**2.2022**	**0.0913**	**2.2935**	**0.5886**	**0.0899**	**0.6785**	**0.0000**	**2,907.5370**	**2,907.5370**	**0.1583**	**6.7700e-003**	**2,913.5111**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.0130	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465	0.0000	15.1749	15.1749	0.0147	0.0000	15.5435
Energy	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503
Mobile	0.6245	2.7072	7.4705	0.0248	2.2022	0.0214	2.2236	0.5886	0.0200	0.6086		2,523.3049	2,523.3049	0.1365		2,526.7173
Total	**3.6713**	**3.0937**	**16.0375**	**0.0271**	**2.2022**	**0.0913**	**2.2935**	**0.5886**	**0.0899**	**0.6785**	**0.0000**	**2,907.5370**	**2,907.5370**	**0.1583**	**6.7700e-003**	**2,913.5111**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Fine Grading	Grading	10/1/2019	12/23/2019	5	60	
2	Building Construction	Building Construction	12/24/2019	12/21/2020	5	260	
3	Paving	Paving	12/22/2020	2/1/2021	5	30	
4	Architectural Coating	Architectural Coating	2/2/2020	3/13/2020	5	30	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.93

Residential Indoor: 208,583; Residential Outdoor: 69,528; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 2,472 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Fine Grading	Graders	1	8.00	187	0.41
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Fine Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Fine Grading	4	10.00	0.00	8.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	91.00	18.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Fine Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5525	0.0000	6.5525	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	2.0287	22.7444	10.1518	0.0206		1.0730	1.0730		0.9871	0.9871		2,041.2539	2,041.2539	0.6458		2,057.3997
Total	**2.0287**	**22.7444**	**10.1518**	**0.0206**	**6.5525**	**1.0730**	**7.6255**	**3.3675**	**0.9871**	**4.3546**		**2,041.2539**	**2,041.2539**	**0.6458**		**2,057.3997**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.1900e-003	0.0405	9.2600e-003	1.0000e-004	2.3300e-003	1.5000e-004	2.4800e-003	6.4000e-004	1.5000e-004	7.9000e-004		11.3455	11.3455	1.0600e-003		11.3719
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0444	0.0308	0.2924	8.2000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.4000e-004	0.0223		81.6914	81.6914	2.6400e-003		81.7573
Total	**0.0456**	**0.0712**	**0.3017**	**9.2000e-004**	**0.0845**	**7.4000e-004**	**0.0852**	**0.0224**	**6.9000e-004**	**0.0231**		**93.0368**	**93.0368**	**3.7000e-003**		**93.1292**

3.2 Fine Grading - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5525	0.0000	6.5525	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	2.0287	22.7444	10.1518	0.0206		1.0730	1.0730		0.9871	0.9871	0.0000	2,041.2539	2,041.2539	0.6458		2,057.3997
Total	**2.0287**	**22.7444**	**10.1518**	**0.0206**	**6.5525**	**1.0730**	**7.6255**	**3.3675**	**0.9871**	**4.3546**	**0.0000**	**2,041.2539**	**2,041.2539**	**0.6458**		**2,057.3997**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.1900e-003	0.0405	9.2600e-003	1.0000e-004	2.3300e-003	1.5000e-004	2.4800e-003	6.4000e-004	1.5000e-004	7.9000e-004		11.3455	11.3455	1.0600e-003		11.3719
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0444	0.0308	0.2924	8.2000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.4000e-004	0.0223		81.6914	81.6914	2.6400e-003		81.7573
Total	**0.0456**	**0.0712**	**0.3017**	**9.2000e-004**	**0.0845**	**7.4000e-004**	**0.0852**	**0.0224**	**6.9000e-004**	**0.0231**		**93.0368**	**93.0368**	**3.7000e-003**		**93.1292**

3.3 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.5581	18.9103	15.2545	0.0250		1.0901	1.0901		1.0449	1.0449		2,312.1454	2,312.1454	0.4810		2,324.1705
Total	**2.5581**	**18.9103**	**15.2545**	**0.0250**		**1.0901**	**1.0901**		**1.0449**	**1.0449**		**2,312.1454**	**2,312.1454**	**0.4810**		**2,324.1705**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0864	2.2336	0.6388	4.8500e-003	0.1219	0.0158	0.1377	0.0351	0.0151	0.0502		519.3005	519.3005	0.0438		520.3945
Worker	0.4041	0.2801	2.6608	7.4600e-003	0.7475	5.3300e-003	0.7529	0.1983	4.9100e-003	0.2032		743.3915	743.3915	0.0240		743.9912
Total	**0.4905**	**2.5136**	**3.2996**	**0.0123**	**0.8694**	**0.0211**	**0.8905**	**0.2334**	**0.0200**	**0.2534**		**1,262.6920**	**1,262.6920**	**0.0678**		**1,264.3857**

3.3 Building Construction - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.5581	18.9103	15.2545	0.0250		1.0901	1.0901		1.0449	1.0449	0.0000	2,312.1454	2,312.1454	0.4810		2,324.1705
Total	**2.5581**	**18.9103**	**15.2545**	**0.0250**		**1.0901**	**1.0901**		**1.0449**	**1.0449**	**0.0000**	**2,312.1454**	**2,312.1454**	**0.4810**		**2,324.1705**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0864	2.2336	0.6388	4.8500e-003	0.1219	0.0158	0.1377	0.0351	0.0151	0.0502		519.3005	519.3005	0.0438		520.3945
Worker	0.4041	0.2801	2.6608	7.4600e-003	0.7475	5.3300e-003	0.7529	0.1983	4.9100e-003	0.2032		743.3915	743.3915	0.0240		743.9912
Total	**0.4905**	**2.5136**	**3.2996**	**0.0123**	**0.8694**	**0.0211**	**0.8905**	**0.2334**	**0.0200**	**0.2534**		**1,262.6920**	**1,262.6920**	**0.0678**		**1,264.3857**

3.3 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2879	17.4336	14.8972	0.0250		0.9482	0.9482		0.9089	0.9089		2,288.887 7	2,288.887 7	0.4646		2,300.501 4
Total	**2.2879**	**17.4336**	**14.8972**	**0.0250**		**0.9482**	**0.9482**		**0.9089**	**0.9089**		**2,288.887 7**	**2,288.887 7**	**0.4646**		**2,300.501 4**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0705	2.0280	0.5738	4.8000e-003	0.1219	0.0101	0.1320	0.0351	9.6800e-003	0.0448		515.6320	515.6320	0.0415		516.6693
Worker	0.3782	0.2526	2.4320	7.2300e-003	0.7475	5.2500e-003	0.7528	0.1983	4.8300e-003	0.2031		719.9301	719.9301	0.0217		720.4720
Total	**0.4487**	**2.2806**	**3.0058**	**0.0120**	**0.8694**	**0.0154**	**0.8848**	**0.2334**	**0.0145**	**0.2479**		**1,235.562 1**	**1,235.562 1**	**0.0632**		**1,237.141 2**

3.3 Building Construction - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2879	17.4336	14.8972	0.0250		0.9482	0.9482		0.9089	0.9089	0.0000	2,288.8877	2,288.8877	0.4646		2,300.5014
Total	**2.2879**	**17.4336**	**14.8972**	**0.0250**		**0.9482**	**0.9482**		**0.9089**	**0.9089**	**0.0000**	**2,288.8877**	**2,288.8877**	**0.4646**		**2,300.5014**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0705	2.0280	0.5738	4.8000e-003	0.1219	0.0101	0.1320	0.0351	9.6800e-003	0.0448		515.6320	515.6320	0.0415		516.6693
Worker	0.3782	0.2526	2.4320	7.2300e-003	0.7475	5.2500e-003	0.7528	0.1983	4.8300e-003	0.2031		719.9301	719.9301	0.0217		720.4720
Total	**0.4487**	**2.2806**	**3.0058**	**0.0120**	**0.8694**	**0.0154**	**0.8848**	**0.2334**	**0.0145**	**0.2479**		**1,235.5621**	**1,235.5621**	**0.0632**		**1,237.1412**

3.4 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1547	11.5873	11.8076	0.0178		0.6565	0.6565		0.6051	0.6051		1,709.2180	1,709.2180	0.5417		1,722.7605
Paving	0.0812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2359**	**11.5873**	**11.8076**	**0.0178**		**0.6565**	**0.6565**		**0.6051**	**0.6051**		**1,709.2180**	**1,709.2180**	**0.5417**		**1,722.7605**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0623	0.0416	0.4009	1.1900e-003	0.1232	8.6000e-004	0.1241	0.0327	8.0000e-004	0.0335		118.6698	118.6698	3.5700e-003		118.7591
Total	**0.0623**	**0.0416**	**0.4009**	**1.1900e-003**	**0.1232**	**8.6000e-004**	**0.1241**	**0.0327**	**8.0000e-004**	**0.0335**		**118.6698**	**118.6698**	**3.5700e-003**		**118.7591**

3.4 Paving - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1547	11.5873	11.8076	0.0178		0.6565	0.6565		0.6051	0.6051	0.0000	1,709.218 0	1,709.218 0	0.5417		1,722.760 5
Paving	0.0812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2359**	**11.5873**	**11.8076**	**0.0178**		**0.6565**	**0.6565**		**0.6051**	**0.6051**	**0.0000**	**1,709.218 0**	**1,709.218 0**	**0.5417**		**1,722.760 5**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0623	0.0416	0.4009	1.1900e-003	0.1232	8.6000e-004	0.1241	0.0327	8.0000e-004	0.0335		118.6698	118.6698	3.5700e-003		118.7591
Total	**0.0623**	**0.0416**	**0.4009**	**1.1900e-003**	**0.1232**	**8.6000e-004**	**0.1241**	**0.0327**	**8.0000e-004**	**0.0335**		**118.6698**	**118.6698**	**3.5700e-003**		**118.7591**

3.4 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0633	10.6478	11.7756	0.0178		0.5826	0.5826		0.5371	0.5371		1,709.1107	1,709.1107	0.5417		1,722.6524
Paving	0.0812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1445**	**10.6478**	**11.7756**	**0.0178**		**0.5826**	**0.5826**		**0.5371**	**0.5371**		**1,709.1107**	**1,709.1107**	**0.5417**		**1,722.6524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0588	0.0378	0.3740	1.1500e-003	0.1232	8.5000e-004	0.1241	0.0327	7.8000e-004	0.0335		114.6821	114.6821	3.2900e-003		114.7645
Total	**0.0588**	**0.0378**	**0.3740**	**1.1500e-003**	**0.1232**	**8.5000e-004**	**0.1241**	**0.0327**	**7.8000e-004**	**0.0335**		**114.6821**	**114.6821**	**3.2900e-003**		**114.7645**

3.4 Paving - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0633	10.6478	11.7756	0.0178		0.5826	0.5826		0.5371	0.5371	0.0000	1,709.1107	1,709.1107	0.5417		1,722.652 4
Paving	0.0812					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1445**	**10.6478**	**11.7756**	**0.0178**		**0.5826**	**0.5826**		**0.5371**	**0.5371**	**0.0000**	**1,709.110 7**	**1,709.110 7**	**0.5417**		**1,722.652 4**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0588	0.0378	0.3740	1.1500e-003	0.1232	8.5000e-004	0.1241	0.0327	7.8000e-004	0.0335		114.6821	114.6821	3.2900e-003		114.7645
Total	**0.0588**	**0.0378**	**0.3740**	**1.1500e-003**	**0.1232**	**8.5000e-004**	**0.1241**	**0.0327**	**7.8000e-004**	**0.0335**		**114.6821**	**114.6821**	**3.2900e-003**		**114.7645**

3.5 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.4070					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**65.6492**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0748	0.0500	0.4810	1.4300e-003	0.1479	1.0400e-003	0.1489	0.0392	9.6000e-004	0.0402		142.4038	142.4038	4.2900e-003		142.5109
Total	**0.0748**	**0.0500**	**0.4810**	**1.4300e-003**	**0.1479**	**1.0400e-003**	**0.1489**	**0.0392**	**9.6000e-004**	**0.0402**		**142.4038**	**142.4038**	**4.2900e-003**		**142.5109**

3.5 Architectural Coating - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.4070					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**65.6492**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0748	0.0500	0.4810	1.4300e-003	0.1479	1.0400e-003	0.1489	0.0392	9.6000e-004	0.0402		142.4038	142.4038	4.2900e-003		142.5109
Total	**0.0748**	**0.0500**	**0.4810**	**1.4300e-003**	**0.1479**	**1.0400e-003**	**0.1489**	**0.0392**	**9.6000e-004**	**0.0402**		**142.4038**	**142.4038**	**4.2900e-003**		**142.5109**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.6245	2.7072	7.4705	0.0248	2.2022	0.0214	2.2236	0.5886	0.0200	0.6086		2,523.3049	2,523.3049	0.1365		2,526.7173
Unmitigated	0.6245	2.7072	7.4705	0.0248	2.2022	0.0214	2.2236	0.5886	0.0200	0.6086		2,523.3049	2,523.3049	0.1365		2,526.7173

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Retirement Community	363.12	213.18	204.00	912,277	912,277
Total	363.12	213.18	204.00	912,277	912,277

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Retirement Community	10.80	7.30	7.50	42.00	18.00	40.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Retirement Community	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503
NaturalGas Unmitigated	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	3136.99	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503
Total		**0.0338**	**0.2891**	**0.1230**	**1.8500e-003**		**0.0234**	**0.0234**		**0.0234**	**0.0234**		**369.0572**	**369.0572**	**7.0700e-003**	**6.7700e-003**	**371.2503**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	3.13699	0.0338	0.2891	0.1230	1.8500e-003		0.0234	0.0234		0.0234	0.0234		369.0572	369.0572	7.0700e-003	6.7700e-003	371.2503
Total		**0.0338**	**0.2891**	**0.1230**	**1.8500e-003**		**0.0234**	**0.0234**		**0.0234**	**0.0234**		**369.0572**	**369.0572**	**7.0700e-003**	**6.7700e-003**	**371.2503**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.0130	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465	0.0000	15.1749	15.1749	0.0147	0.0000	15.5435
Unmitigated	3.0130	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465	0.0000	15.1749	15.1749	0.0147	0.0000	15.5435

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5376					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.2189					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2565	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465		15.1749	15.1749	0.0147		15.5435
Total	**3.0130**	**0.0975**	**8.4440**	**4.5000e-004**		**0.0465**	**0.0465**		**0.0465**	**0.0465**	**0.0000**	**15.1749**	**15.1749**	**0.0147**	**0.0000**	**15.5435**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5376					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.2189					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2565	0.0975	8.4440	4.5000e-004		0.0465	0.0465		0.0465	0.0465		15.1749	15.1749	0.0147		15.5435
Total	**3.0130**	**0.0975**	**8.4440**	**4.5000e-004**		**0.0465**	**0.0465**		**0.0465**	**0.0465**	**0.0000**	**15.1749**	**15.1749**	**0.0147**	**0.0000**	**15.5435**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX C

CalEEMod Model Annual Emissions Printouts and CAP Checklist

Ocean Hills Part I OPS ONLY

San Diego County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	50.00	Space	0.45	20,000.00	0
Retirement Community	114.00	Dwelling Unit	3.08	81,764.00	123

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2019
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase I = 114 DU retirement community with 123 beds and a 50-space parking lot on 3.53 ac.

Construction Phase - No construction. Operational analysis only.

Vehicle Trips - Per TIA for phase I, Weekday = 369 trips day => 3.237 trips/DU for 114 units; Sat = 2.09 trips/DU, Sun = 2 trips/DU (Sat and Sun from ITE 10th Ed for landuse 255 Retirement Community)
Area Coating - 150g/L standard

Woodstoves - No woodstoves or fireplaces.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	150
tblFireplaces	NumberGas	62.70	0.00
tblFireplaces	NumberWood	39.90	0.00
tblLandUse	LandUseSquareFeet	114,000.00	81,764.00
tblLandUse	LotAcreage	22.80	3.08
tblLandUse	Population	326.00	123.00
tblVehicleTrips	ST_TR	2.03	2.09
tblVehicleTrips	SU_TR	1.95	2.00
tblVehicleTrips	WD_TR	2.40	3.24
tblWoodstoves	NumberCatalytic	5.70	0.00
tblWoodstoves	NumberNoncatalytic	5.70	0.00

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4241	9.8600e-003	0.8511	4.0000e-005		4.6600e-003	4.6600e-003		4.6600e-003	4.6600e-003	0.0000	1.3836	1.3836	1.3600e-003	0.0000	1.4176
Energy	6.9000e-003	0.0590	0.0251	3.8000e-004		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	235.7985	235.7985	8.0500e-003	2.6500e-003	236.7885
Mobile	0.1189	0.5317	1.4276	4.4000e-003	0.3556	5.0200e-003	0.3607	0.0953	4.7300e-003	0.1000	0.0000	404.7115	404.7115	0.0229	0.0000	405.2827
Waste						0.0000	0.0000		0.0000	0.0000	10.6449	0.0000	10.6449	0.6291	0.0000	26.3722
Water						0.0000	0.0000		0.0000	0.0000	2.3564	48.6088	50.9653	0.2440	6.1200e-003	58.8885
Total	**0.5500**	**0.6005**	**2.3038**	**4.8200e-003**	**0.3556**	**0.0145**	**0.3701**	**0.0953**	**0.0142**	**0.1094**	**13.0013**	**690.5024**	**703.5037**	**0.9053**	**8.7700e-003**	**728.7494**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4241	9.8600e-003	0.8511	4.0000e-005		4.6600e-003	4.6600e-003		4.6600e-003	4.6600e-003	0.0000	1.3836	1.3836	1.3600e-003	0.0000	1.4176
Energy	6.9000e-003	0.0590	0.0251	3.8000e-004		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	235.7985	235.7985	8.0500e-003	2.6500e-003	236.7885
Mobile	0.1189	0.5317	1.4276	4.4000e-003	0.3556	5.0200e-003	0.3607	0.0953	4.7300e-003	0.1000	0.0000	404.7115	404.7115	0.0229	0.0000	405.2827
Waste						0.0000	0.0000		0.0000	0.0000	10.6449	0.0000	10.6449	0.6291	0.0000	26.3722
Water						0.0000	0.0000		0.0000	0.0000	2.3564	48.6088	50.9653	0.2440	6.1200e-003	58.8885
Total	**0.5500**	**0.6005**	**2.3038**	**4.8200e-003**	**0.3556**	**0.0145**	**0.3701**	**0.0953**	**0.0142**	**0.1094**	**13.0013**	**690.5024**	**703.5037**	**0.9053**	**8.7700e-003**	**728.7494**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1189	0.5317	1.4276	4.4000e-003	0.3556	5.0200e-003	0.3607	0.0953	4.7300e-003	0.1000	0.0000	404.7115	404.7115	0.0229	0.0000	405.2827
Unmitigated	0.1189	0.5317	1.4276	4.4000e-003	0.3556	5.0200e-003	0.3607	0.0953	4.7300e-003	0.1000	0.0000	404.7115	404.7115	0.0229	0.0000	405.2827

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Retirement Community	369.36	238.26	228.00	943,498	943,498
Total	369.36	238.26	228.00	943,498	943,498

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Retirement Community	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Retirement Community	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	167.5085	167.5085	6.7400e-003	1.3900e-003	168.0927
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	167.5085	167.5085	6.7400e-003	1.3900e-003	168.0927
NaturalGas Mitigated	6.9000e-003	0.0590	0.0251	3.8000e-004		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	68.2900	68.2900	1.3100e-003	1.2500e-003	68.6958
NaturalGas Unmitigated	6.9000e-003	0.0590	0.0251	3.8000e-004		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	68.2900	68.2900	1.3100e-003	1.2500e-003	68.6958

5.2 Energy by Land Use - NaturalGas

Unmitigated

Land Use	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	1.27971e+006	6.9000e-003	0.0590	0.0251	3.8000e-004		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	68.2900	68.2900	1.3100e-003	1.2500e-003	68.6958
Total		**6.9000e-003**	**0.0590**	**0.0251**	**3.8000e-004**		**4.7700e-003**	**4.7700e-003**		**4.7700e-003**	**4.7700e-003**	**0.0000**	**68.2900**	**68.2900**	**1.3100e-003**	**1.2500e-003**	**68.6958**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	1.27971e+006	6.9000e-003	0.0590	0.0251	3.8000e-004		4.7700e-003	4.7700e-003		4.7700e-003	4.7700e-003	0.0000	68.2900	68.2900	1.3100e-003	1.2500e-003	68.6958
Total		**6.9000e-003**	**0.0590**	**0.0251**	**3.8000e-004**		**4.7700e-003**	**4.7700e-003**		**4.7700e-003**	**4.7700e-003**	**0.0000**	**68.2900**	**68.2900**	**1.3100e-003**	**1.2500e-003**	**68.6958**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	7000	2.2877	9.0000e-005	2.0000e-005	2.2956
Retirement Community	505558	165.2208	6.6500e-003	1.3800e-003	165.7971
Total		**167.5085**	**6.7400e-003**	**1.4000e-003**	**168.0927**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	7000	2.2877	9.0000e-005	2.0000e-005	2.2956
Retirement Community	505558	165.2208	6.6500e-003	1.3800e-003	165.7971
Total		**167.5085**	**6.7400e-003**	**1.4000e-003**	**168.0927**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4241	9.8600e-003	0.8511	4.0000e-005		4.6600e-003	4.6600e-003		4.6600e-003	4.6600e-003	0.0000	1.3836	1.3836	1.3600e-003	0.0000	1.4176
Unmitigated	0.4241	9.8600e-003	0.8511	4.0000e-005		4.6600e-003	4.6600e-003		4.6600e-003	4.6600e-003	0.0000	1.3836	1.3836	1.3600e-003	0.0000	1.4176

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0774					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3206					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0261	9.8600e-003	0.8511	4.0000e-005		4.6600e-003	4.6600e-003		4.6600e-003	4.6600e-003	0.0000	1.3836	1.3836	1.3600e-003	0.0000	1.4176
Total	**0.4241**	**9.8600e-003**	**0.8511**	**4.0000e-005**		**4.6600e-003**	**4.6600e-003**		**4.6600e-003**	**4.6600e-003**	**0.0000**	**1.3836**	**1.3836**	**1.3600e-003**	**0.0000**	**1.4176**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0774					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3206					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0261	9.8600e-003	0.8511	4.0000e-005		4.6600e-003	4.6600e-003		4.6600e-003	4.6600e-003	0.0000	1.3836	1.3836	1.3600e-003	0.0000	1.4176
Total	**0.4241**	**9.8600e-003**	**0.8511**	**4.0000e-005**		**4.6600e-003**	**4.6600e-003**		**4.6600e-003**	**4.6600e-003**	**0.0000**	**1.3836**	**1.3836**	**1.3600e-003**	**0.0000**	**1.4176**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	50.9653	0.2440	6.1200e-003	58.8885
Unmitigated	50.9653	0.2440	6.1200e-003	58.8885

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Retirement Community	7.42756 / 4.68259	50.9653	0.2440	6.1200e-003	58.8885
Total		**50.9653**	**0.2440**	**6.1200e-003**	**58.8885**

Mitigated

Land Use	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Retirement Community	7.42756 / 4.68259	50.9653	0.2440	6.1200e-003	58.8885
Total		**50.9653**	**0.2440**	**6.1200e-003**	**58.8885**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	10.6449	0.6291	0.0000	26.3722
Unmitigated	10.6449	0.6291	0.0000	26.3722

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Retirement Community	52.44	10.6449	0.6291	0.0000	26.3722
Total		**10.6449**	**0.6291**	**0.0000**	**26.3722**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Retirement Community	52.44	10.6449	0.6291	0.0000	26.3722
Total		**10.6449**	**0.6291**	**0.0000**	**26.3722**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Ocean Hills Phase II

San Diego County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	103.00	Space	0.93	41,200.00	0
Retirement Community	102.00	Dwelling Unit	2.00	103,004.00	121

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.6 **Precipitation Freq (Days)** 40

Climate Zone 13 **Operational Year** 2021

Utility Company San Diego Gas & Electric

CO2 Intensity (lb/MWhr) 720.49 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Phase II = 102 DU, 121 beds in a 103,004 SF building, a 103-space parking lot on 2.93 ac.

Construction Phase - Site already mass graded. Construction starts ~Oct 2019 and continue until ~March 2021. Grading and infrastructure to take ~60 days.

Trips and VMT -

Grading - 2,562 CY cut and 2,502 CY of fill = 60 CY of export

Architectural Coating - 150 g/L standard

Vehicle Trips - Trip generation per TIA = 3.559 trips/DU weekday; 2.09 trips/DU Sat and 2 trips/DU Sun.

Area Coating - 150g/L standard

Construction Off-road Equipment Mitigation -

Woodstoves - No woodstoves or fireplaces

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	150.00
tblAreaCoating	Area_EF_Residential_Exterior	250	150
tblAreaCoating	Area_EF_Residential_Interior	250	150
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	NumDays	220.00	260.00
tblConstructionPhase	NumDays	6.00	60.00
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	PhaseEndDate	9/8/2020	3/13/2020
tblConstructionPhase	PhaseEndDate	8/11/2020	12/21/2020
tblConstructionPhase	PhaseEndDate	10/8/2019	12/23/2019
tblConstructionPhase	PhaseEndDate	8/25/2020	2/1/2021
tblConstructionPhase	PhaseStartDate	8/26/2020	2/2/2020
tblConstructionPhase	PhaseStartDate	10/9/2019	12/24/2019
tblConstructionPhase	PhaseStartDate	8/12/2020	12/22/2020

tblFireplaces	NumberGas	56.10	0.00
tblFireplaces	NumberWood	35.70	0.00
tblGrading	MaterialExported	0.00	60.00
tblLandUse	LandUseSquareFeet	102,000.00	103,004.00
tblLandUse	LotAcreage	20.40	2.00
tblLandUse	Population	292.00	121.00
tblVehicleTrips	HO_TTP	39.60	40.00
tblVehicleTrips	HS_TTP	18.80	18.00
tblVehicleTrips	HW_TTP	41.60	42.00
tblVehicleTrips	ST_TR	2.03	2.09
tblVehicleTrips	SU_TR	1.95	2.00
tblVehicleTrips	WD_TR	2.40	3.56
tblWoodstoves	NumberCatalytic	5.10	0.00
tblWoodstoves	NumberNoncatalytic	5.10	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0711	0.7488	0.3692	7.6000e-004	0.2016	0.0355	0.2371	0.1024	0.0328	0.1352	0.0000	67.8818	67.8818	0.0192	0.0000	68.3610
2020	1.3328	2.5787	2.3540	4.8700e-003	0.1105	0.1267	0.2372	0.0297	0.1214	0.1511	0.0000	420.2253	420.2253	0.0630	0.0000	421.8001
2021	0.0132	0.1175	0.1337	2.1000e-004	1.3200e-003	6.4200e-003	7.7400e-003	3.5000e-004	5.9200e-003	6.2700e-003	0.0000	18.2111	18.2111	5.4400e-003	0.0000	18.3471
Maximum	**1.3328**	**2.5787**	**2.3540**	**4.8700e-003**	**0.2016**	**0.1267**	**0.2372**	**0.1024**	**0.1214**	**0.1511**	**0.0000**	**420.2253**	**420.2253**	**0.0630**	**0.0000**	**421.8001**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0711	0.7488	0.3692	7.6000e-004	0.2016	0.0355	0.2371	0.1024	0.0328	0.1352	0.0000	67.8818	67.8818	0.0192	0.0000	68.3609
2020	1.3328	2.5787	2.3540	4.8700e-003	0.1105	0.1267	0.2372	0.0297	0.1214	0.1511	0.0000	420.2249	420.2249	0.0630	0.0000	421.7998
2021	0.0132	0.1175	0.1337	2.1000e-004	1.3200e-003	6.4200e-003	7.7400e-003	3.5000e-004	5.9200e-003	6.2700e-003	0.0000	18.2111	18.2111	5.4400e-003	0.0000	18.3471
Maximum	**1.3328**	**2.5787**	**2.3540**	**4.8700e-003**	**0.2016**	**0.1267**	**0.2372**	**0.1024**	**0.1214**	**0.1511**	**0.0000**	**420.2249**	**420.2249**	**0.0630**	**0.0000**	**421.7998**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**10-1-2019**	**12-31-2019**	0.8166	0.8166
2	**1-1-2020**	**3-31-2020**	1.7174	1.7174
3	**4-1-2020**	**6-30-2020**	0.7273	0.7273
4	**7-1-2020**	**9-30-2020**	0.7353	0.7353
5	**10-1-2020**	**12-31-2020**	0.7037	0.7037
6	**1-1-2021**	**3-31-2021**	0.1359	0.1359
		Highest	1.7174	1.7174

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.5261	8.7700e-003	0.7600	4.0000e-005		4.1900e-003	4.1900e-003		4.1900e-003	4.1900e-003	0.0000	1.2390	1.2390	1.2000e-003	0.0000	1.2691
Energy	6.1700e-003	0.0528	0.0225	3.4000e-004		4.2700e-003	4.2700e-003		4.2700e-003	4.2700e-003	0.0000	213.6433	213.6433	7.3100e-003	2.3900e-003	214.5384
Mobile	0.0975	0.4340	1.1817	4.0100e-003	0.3438	3.4100e-003	0.3472	0.0921	3.1900e-003	0.0953	0.0000	369.3653	369.3653	0.0196	0.0000	369.8552
Waste						0.0000	0.0000		0.0000	0.0000	9.5243	0.0000	9.5243	0.5629	0.0000	23.5961
Water						0.0000	0.0000		0.0000	0.0000	2.1084	43.4921	45.6005	0.2183	5.4800e-003	52.6897
Total	**0.6298**	**0.4956**	**1.9641**	**4.3900e-003**	**0.3438**	**0.0119**	**0.3557**	**0.0921**	**0.0117**	**0.1037**	**11.6327**	**627.7397**	**639.3724**	**0.8093**	**7.8700e-003**	**661.9486**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.5261	8.7700e-003	0.7600	4.0000e-005		4.1900e-003	4.1900e-003		4.1900e-003	4.1900e-003	0.0000	1.2390	1.2390	1.2000e-003	0.0000	1.2691
Energy	6.1700e-003	0.0528	0.0225	3.4000e-004		4.2700e-003	4.2700e-003		4.2700e-003	4.2700e-003	0.0000	213.6433	213.6433	7.3100e-003	2.3900e-003	214.5384
Mobile	0.0975	0.4340	1.1817	4.0100e-003	0.3438	3.4100e-003	0.3472	0.0921	3.1900e-003	0.0953	0.0000	369.3653	369.3653	0.0196	0.0000	369.8552
Waste						0.0000	0.0000		0.0000	0.0000	9.5243	0.0000	9.5243	0.5629	0.0000	23.5961
Water						0.0000	0.0000		0.0000	0.0000	2.1084	43.4921	45.6005	0.2183	5.4800e-003	52.6897
Total	**0.6298**	**0.4956**	**1.9641**	**4.3900e-003**	**0.3438**	**0.0119**	**0.3557**	**0.0921**	**0.0117**	**0.1037**	**11.6327**	**627.7397**	**639.3724**	**0.8093**	**7.8700e-003**	**661.9486**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Fine Grading	Grading	10/1/2019	12/23/2019	5	60	
2	Building Construction	Building Construction	12/24/2019	12/21/2020	5	260	
3	Paving	Paving	12/22/2020	2/1/2021	5	30	
4	Architectural Coating	Architectural Coating	2/2/2020	3/13/2020	5	30	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.93

Residential Indoor: 208,583; Residential Outdoor: 69,528; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 2,472 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Fine Grading	Graders	1	8.00	187	0.41
Fine Grading	Rubber Tired Dozers	1	8.00	247	0.40
Fine Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Fine Grading	4	10.00	0.00	8.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	91.00	18.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Fine Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1966	0.0000	0.1966	0.1010	0.0000	0.1010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0609	0.6823	0.3046	6.2000e-004		0.0322	0.0322		0.0296	0.0296	0.0000	55.5538	55.5538	0.0176	0.0000	55.9933
Total	**0.0609**	**0.6823**	**0.3046**	**6.2000e-004**	**0.1966**	**0.0322**	**0.2288**	**0.1010**	**0.0296**	**0.1306**	**0.0000**	**55.5538**	**55.5538**	**0.0176**	**0.0000**	**55.9933**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.0000e-005	1.2300e-003	2.7000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.3118	0.3118	3.0000e-005	0.0000	0.3125
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1800e-003	9.1000e-004	8.7800e-003	2.0000e-005	2.4100e-003	2.0000e-005	2.4200e-003	6.4000e-004	2.0000e-005	6.6000e-004	0.0000	2.2455	2.2455	7.0000e-005	0.0000	2.2473
Total	**1.2200e-003**	**2.1400e-003**	**9.0500e-003**	**2.0000e-005**	**2.4800e-003**	**2.0000e-005**	**2.4900e-003**	**6.6000e-004**	**2.0000e-005**	**6.8000e-004**	**0.0000**	**2.5573**	**2.5573**	**1.0000e-004**	**0.0000**	**2.5598**

3.2 Fine Grading - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1966	0.0000	0.1966	0.1010	0.0000	0.1010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0609	0.6823	0.3046	6.2000e-004		0.0322	0.0322		0.0296	0.0296	0.0000	55.5538	55.5538	0.0176	0.0000	55.9932
Total	**0.0609**	**0.6823**	**0.3046**	**6.2000e-004**	**0.1966**	**0.0322**	**0.2288**	**0.1010**	**0.0296**	**0.1306**	**0.0000**	**55.5538**	**55.5538**	**0.0176**	**0.0000**	**55.9932**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.0000e-005	1.2300e-003	2.7000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.3118	0.3118	3.0000e-005	0.0000	0.3125
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1800e-003	9.1000e-004	8.7800e-003	2.0000e-005	2.4100e-003	2.0000e-005	2.4200e-003	6.4000e-004	2.0000e-005	6.6000e-004	0.0000	2.2455	2.2455	7.0000e-005	0.0000	2.2473
Total	**1.2200e-003**	**2.1400e-003**	**9.0500e-003**	**2.0000e-005**	**2.4800e-003**	**2.0000e-005**	**2.4900e-003**	**6.6000e-004**	**2.0000e-005**	**6.8000e-004**	**0.0000**	**2.5573**	**2.5573**	**1.0000e-004**	**0.0000**	**2.5598**

3.3 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.6700e-003	0.0567	0.0458	8.0000e-005		3.2700e-003	3.2700e-003		3.1300e-003	3.1300e-003	0.0000	6.2926	6.2926	1.3100e-003	0.0000	6.3254
Total	**7.6700e-003**	**0.0567**	**0.0458**	**8.0000e-005**		**3.2700e-003**	**3.2700e-003**		**3.1300e-003**	**3.1300e-003**	**0.0000**	**6.2926**	**6.2926**	**1.3100e-003**	**0.0000**	**6.3254**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.5000e-004	6.7800e-003	1.8200e-003	1.0000e-005	3.6000e-004	5.0000e-005	4.1000e-004	1.0000e-004	4.0000e-005	1.5000e-004	0.0000	1.4347	1.4347	1.2000e-004	0.0000	1.4375
Worker	1.0800e-003	8.3000e-004	7.9900e-003	2.0000e-005	2.1900e-003	2.0000e-005	2.2100e-003	5.8000e-004	1.0000e-005	6.0000e-004	0.0000	2.0434	2.0434	7.0000e-005	0.0000	2.0450
Total	**1.3300e-003**	**7.6100e-003**	**9.8100e-003**	**3.0000e-005**	**2.5500e-003**	**7.0000e-005**	**2.6200e-003**	**6.8000e-004**	**5.0000e-005**	**7.5000e-004**	**0.0000**	**3.4781**	**3.4781**	**1.9000e-004**	**0.0000**	**3.4826**

3.3 Building Construction - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.6700e-003	0.0567	0.0458	8.0000e-005		3.2700e-003	3.2700e-003		3.1300e-003	3.1300e-003	0.0000	6.2926	6.2926	1.3100e-003	0.0000	6.3254
Total	**7.6700e-003**	**0.0567**	**0.0458**	**8.0000e-005**		**3.2700e-003**	**3.2700e-003**		**3.1300e-003**	**3.1300e-003**	**0.0000**	**6.2926**	**6.2926**	**1.3100e-003**	**0.0000**	**6.3254**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.5000e-004	6.7800e-003	1.8200e-003	1.0000e-005	3.6000e-004	5.0000e-005	4.1000e-004	1.0000e-004	4.0000e-005	1.5000e-004	0.0000	1.4347	1.4347	1.2000e-004	0.0000	1.4375
Worker	1.0800e-003	8.3000e-004	7.9900e-003	2.0000e-005	2.1900e-003	2.0000e-005	2.2100e-003	5.8000e-004	1.0000e-005	6.0000e-004	0.0000	2.0434	2.0434	7.0000e-005	0.0000	2.0450
Total	**1.3300e-003**	**7.6100e-003**	**9.8100e-003**	**3.0000e-005**	**2.5500e-003**	**7.0000e-005**	**2.6200e-003**	**6.8000e-004**	**5.0000e-005**	**7.5000e-004**	**0.0000**	**3.4781**	**3.4781**	**1.9000e-004**	**0.0000**	**3.4826**

3.3 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2906	2.2141	1.8919	3.1800e-003		0.1204	0.1204		0.1154	0.1154	0.0000	263.7084	263.7084	0.0535	0.0000	265.0464
Total	**0.2906**	**2.2141**	**1.8919**	**3.1800e-003**		**0.1204**	**0.1204**		**0.1154**	**0.1154**	**0.0000**	**263.7084**	**263.7084**	**0.0535**	**0.0000**	**265.0464**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.7100e-003	0.2606	0.0692	6.2000e-004	0.0152	1.2700e-003	0.0164	4.3800e-003	1.2200e-003	5.6000e-003	0.0000	60.3187	60.3187	4.6200e-003	0.0000	60.4343
Worker	0.0426	0.0315	0.3093	9.3000e-004	0.0927	6.7000e-004	0.0933	0.0246	6.1000e-004	0.0252	0.0000	83.7739	83.7739	2.5200e-003	0.0000	83.8367
Total	**0.0513**	**0.2921**	**0.3785**	**1.5500e-003**	**0.1079**	**1.9400e-003**	**0.1098**	**0.0290**	**1.8300e-003**	**0.0308**	**0.0000**	**144.0926**	**144.0926**	**7.1400e-003**	**0.0000**	**144.2711**

3.3 Building Construction - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2906	2.2141	1.8919	3.1800e-003		0.1204	0.1204		0.1154	0.1154	0.0000	263.7081	263.7081	0.0535	0.0000	265.0461
Total	**0.2906**	**2.2141**	**1.8919**	**3.1800e-003**		**0.1204**	**0.1204**		**0.1154**	**0.1154**	**0.0000**	**263.7081**	**263.7081**	**0.0535**	**0.0000**	**265.0461**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.7100e-003	0.2606	0.0692	6.2000e-004	0.0152	1.2700e-003	0.0164	4.3800e-003	1.2200e-003	5.6000e-003	0.0000	60.3187	60.3187	4.6200e-003	0.0000	60.4343
Worker	0.0426	0.0315	0.3093	9.3000e-004	0.0927	6.7000e-004	0.0933	0.0246	6.1000e-004	0.0252	0.0000	83.7739	83.7739	2.5200e-003	0.0000	83.8367
Total	**0.0513**	**0.2921**	**0.3785**	**1.5500e-003**	**0.1079**	**1.9400e-003**	**0.1098**	**0.0290**	**1.8300e-003**	**0.0308**	**0.0000**	**144.0926**	**144.0926**	**7.1400e-003**	**0.0000**	**144.2711**

3.4 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.6200e-003	0.0464	0.0472	7.0000e-005		2.6300e-003	2.6300e-003		2.4200e-003	2.4200e-003	0.0000	6.2023	6.2023	1.9700e-003	0.0000	6.2515
Paving	3.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.9400e-003**	**0.0464**	**0.0472**	**7.0000e-005**		**2.6300e-003**	**2.6300e-003**		**2.4200e-003**	**2.4200e-003**	**0.0000**	**6.2023**	**6.2023**	**1.9700e-003**	**0.0000**	**6.2515**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2000e-004	1.6000e-004	1.6100e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4349	0.4349	1.0000e-005	0.0000	0.4353
Total	**2.2000e-004**	**1.6000e-004**	**1.6100e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4349**	**0.4349**	**1.0000e-005**	**0.0000**	**0.4353**

3.4 Paving - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.6200e-003	0.0464	0.0472	7.0000e-005		2.6300e-003	2.6300e-003		2.4200e-003	2.4200e-003	0.0000	6.2023	6.2023	1.9700e-003	0.0000	6.2514
Paving	3.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.9400e-003**	**0.0464**	**0.0472**	**7.0000e-005**		**2.6300e-003**	**2.6300e-003**		**2.4200e-003**	**2.4200e-003**	**0.0000**	**6.2023**	**6.2023**	**1.9700e-003**	**0.0000**	**6.2514**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2000e-004	1.6000e-004	1.6100e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4349	0.4349	1.0000e-005	0.0000	0.4353
Total	**2.2000e-004**	**1.6000e-004**	**1.6100e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4349**	**0.4349**	**1.0000e-005**	**0.0000**	**0.4353**

3.4 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0117	0.1171	0.1295	2.0000e-004		6.4100e-003	6.4100e-003		5.9100e-003	5.9100e-003	0.0000	17.0553	17.0553	5.4100e-003	0.0000	17.1904
Paving	8.9000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0126**	**0.1171**	**0.1295**	**2.0000e-004**		**6.4100e-003**	**6.4100e-003**		**5.9100e-003**	**5.9100e-003**	**0.0000**	**17.0553**	**17.0553**	**5.4100e-003**	**0.0000**	**17.1904**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7000e-004	4.1000e-004	4.1200e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.1559	1.1559	3.0000e-005	0.0000	1.1567
Total	**5.7000e-004**	**4.1000e-004**	**4.1200e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3300e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**	**0.0000**	**1.1559**	**1.1559**	**3.0000e-005**	**0.0000**	**1.1567**

3.4 Paving - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0117	0.1171	0.1295	2.0000e-004		6.4100e-003	6.4100e-003		5.9100e-003	5.9100e-003	0.0000	17.0553	17.0553	5.4100e-003	0.0000	17.1904
Paving	8.9000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0126**	**0.1171**	**0.1295**	**2.0000e-004**		**6.4100e-003**	**6.4100e-003**		**5.9100e-003**	**5.9100e-003**	**0.0000**	**17.0553**	**17.0553**	**5.4100e-003**	**0.0000**	**17.1904**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7000e-004	4.1000e-004	4.1200e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.1559	1.1559	3.0000e-005	0.0000	1.1567
Total	**5.7000e-004**	**4.1000e-004**	**4.1200e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3300e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**	**0.0000**	**1.1559**	**1.1559**	**3.0000e-005**	**0.0000**	**1.1567**

3.5 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.9811					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6300e-003	0.0253	0.0275	4.0000e-005		1.6600e-003	1.6600e-003		1.6600e-003	1.6600e-003	0.0000	3.8299	3.8299	3.0000e-004	0.0000	3.8373
Total	**0.9847**	**0.0253**	**0.0275**	**4.0000e-005**		**1.6600e-003**	**1.6600e-003**		**1.6600e-003**	**1.6600e-003**	**0.0000**	**3.8299**	**3.8299**	**3.0000e-004**	**0.0000**	**3.8373**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-003	7.4000e-004	7.2200e-003	2.0000e-005	2.1700e-003	2.0000e-005	2.1800e-003	5.8000e-004	1.0000e-005	5.9000e-004	0.0000	1.9572	1.9572	6.0000e-005	0.0000	1.9586
Total	**1.0000e-003**	**7.4000e-004**	**7.2200e-003**	**2.0000e-005**	**2.1700e-003**	**2.0000e-005**	**2.1800e-003**	**5.8000e-004**	**1.0000e-005**	**5.9000e-004**	**0.0000**	**1.9572**	**1.9572**	**6.0000e-005**	**0.0000**	**1.9586**

3.5 Architectural Coating - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.9811					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6300e-003	0.0253	0.0275	4.0000e-005		1.6600e-003	1.6600e-003		1.6600e-003	1.6600e-003	0.0000	3.8299	3.8299	3.0000e-004	0.0000	3.8373
Total	**0.9847**	**0.0253**	**0.0275**	**4.0000e-005**		**1.6600e-003**	**1.6600e-003**		**1.6600e-003**	**1.6600e-003**	**0.0000**	**3.8299**	**3.8299**	**3.0000e-004**	**0.0000**	**3.8373**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-003	7.4000e-004	7.2200e-003	2.0000e-005	2.1700e-003	2.0000e-005	2.1800e-003	5.8000e-004	1.0000e-005	5.9000e-004	0.0000	1.9572	1.9572	6.0000e-005	0.0000	1.9586
Total	**1.0000e-003**	**7.4000e-004**	**7.2200e-003**	**2.0000e-005**	**2.1700e-003**	**2.0000e-005**	**2.1800e-003**	**5.8000e-004**	**1.0000e-005**	**5.9000e-004**	**0.0000**	**1.9572**	**1.9572**	**6.0000e-005**	**0.0000**	**1.9586**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0975	0.4340	1.1817	4.0100e-003	0.3438	3.4100e-003	0.3472	0.0921	3.1900e-003	0.0953	0.0000	369.3653	369.3653	0.0196	0.0000	369.8552
Unmitigated	0.0975	0.4340	1.1817	4.0100e-003	0.3438	3.4100e-003	0.3472	0.0921	3.1900e-003	0.0953	0.0000	369.3653	369.3653	0.0196	0.0000	369.8552

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Retirement Community	363.12	213.18	204.00	912,277	912,277
Total	363.12	213.18	204.00	912,277	912,277

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Retirement Community	10.80	7.30	7.50	42.00	18.00	40.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Retirement Community	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	152.5417	152.5417	6.1400e-003	1.2700e-003	153.0738
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	152.5417	152.5417	6.1400e-003	1.2700e-003	153.0738
NaturalGas Mitigated	6.1700e-003	0.0528	0.0225	3.4000e-004		4.2700e-003	4.2700e-003		4.2700e-003	4.2700e-003	0.0000	61.1016	61.1016	1.1700e-003	1.1200e-003	61.4647
NaturalGas Unmitigated	6.1700e-003	0.0528	0.0225	3.4000e-004		4.2700e-003	4.2700e-003		4.2700e-003	4.2700e-003	0.0000	61.1016	61.1016	1.1700e-003	1.1200e-003	61.4647

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	1.145e +006	6.1700e-003	0.0528	0.0225	3.4000e-004		4.2700e-003	4.2700e-003		4.2700e-003	4.2700e-003	0.0000	61.1016	61.1016	1.1700e-003	1.1200e-003	61.4647
Total		**6.1700e-003**	**0.0528**	**0.0225**	**3.4000e-004**		**4.2700e-003**	**4.2700e-003**		**4.2700e-003**	**4.2700e-003**	**0.0000**	**61.1016**	**61.1016**	**1.1700e-003**	**1.1200e-003**	**61.4647**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Retirement Community	1.145e +006	6.1700e-003	0.0528	0.0225	3.4000e-004		4.2700e-003	4.2700e-003		4.2700e-003	4.2700e-003	0.0000	61.1016	61.1016	1.1700e-003	1.1200e-003	61.4647
Total		**6.1700e-003**	**0.0528**	**0.0225**	**3.4000e-004**		**4.2700e-003**	**4.2700e-003**		**4.2700e-003**	**4.2700e-003**	**0.0000**	**61.1016**	**61.1016**	**1.1700e-003**	**1.1200e-003**	**61.4647**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	14420	4.7126	1.9000e-004	4.0000e-005	4.7290
Retirement Community	452341	147.8292	5.9500e-003	1.2300e-003	148.3448
Total		**152.5417**	**6.1400e-003**	**1.2700e-003**	**153.0738**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	14420	4.7126	1.9000e-004	4.0000e-005	4.7290
Retirement Community	452341	147.8292	5.9500e-003	1.2300e-003	148.3448
Total		**152.5417**	**6.1400e-003**	**1.2700e-003**	**153.0738**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.5261	8.7700e-003	0.7600	4.0000e-005		4.1900e-003	4.1900e-003		4.1900e-003	4.1900e-003	0.0000	1.2390	1.2390	1.2000e-003	0.0000	1.2691
Unmitigated	0.5261	8.7700e-003	0.7600	4.0000e-005		4.1900e-003	4.1900e-003		4.1900e-003	4.1900e-003	0.0000	1.2390	1.2390	1.2000e-003	0.0000	1.2691

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0981					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4050					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0231	8.7700e-003	0.7600	4.0000e-005		4.1900e-003	4.1900e-003		4.1900e-003	4.1900e-003	0.0000	1.2390	1.2390	1.2000e-003	0.0000	1.2691
Total	**0.5262**	**8.7700e-003**	**0.7600**	**4.0000e-005**		**4.1900e-003**	**4.1900e-003**		**4.1900e-003**	**4.1900e-003**	**0.0000**	**1.2390**	**1.2390**	**1.2000e-003**	**0.0000**	**1.2691**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0981					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4050					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0231	8.7700e-003	0.7600	4.0000e-005		4.1900e-003	4.1900e-003		4.1900e-003	4.1900e-003	0.0000	1.2390	1.2390	1.2000e-003	0.0000	1.2691
Total	**0.5262**	**8.7700e-003**	**0.7600**	**4.0000e-005**		**4.1900e-003**	**4.1900e-003**		**4.1900e-003**	**4.1900e-003**	**0.0000**	**1.2390**	**1.2390**	**1.2000e-003**	**0.0000**	**1.2691**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	45.6005	0.2183	5.4800e-003	52.6897
Unmitigated	45.6005	0.2183	5.4800e-003	52.6897

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Retirement Community	6.64571 / 4.18969	45.6005	0.2183	5.4800e-003	52.6897
Total		**45.6005**	**0.2183**	**5.4800e-003**	**52.6897**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Retirement Community	6.64571 / 4.18969	45.6005	0.2183	5.4800e-003	52.6897
Total		**45.6005**	**0.2183**	**5.4800e-003**	**52.6897**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	9.5243	0.5629	0.0000	23.5961
Unmitigated	9.5243	0.5629	0.0000	23.5961

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Retirement Community	46.92	9.5243	0.5629	0.0000	23.5961
Total		**9.5243**	**0.5629**	**0.0000**	**23.5961**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Retirement Community	46.92	9.5243	0.5629	0.0000	23.5961
Total		**9.5243**	**0.5629**	**0.0000**	**23.5961**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Table 18 Implementation Actions

Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
AF4—Carbon Farming Program			
Implement a Demonstrative Carbon Farming Program	Lead Department: Water Utilities Collaborating with: Development Services Department	Commencement Phase	Designate a Climate Action Planning Team Member to Become Knowledgeable on Sustainable Practices Completed (Y/N)
		Phase 1 Phase 2	Policy Drafted Within 2 year of CAP Adoption
			Policy Quantifies Program Goals Tied to Concrete Metrics (i.e. technologies, acres, water reduction) *Requirements (Y/N)*
			Identified Funding Sources for Program Within 30 months of CAP Adoption
			Identify Interested Parties Within 30 months of CAP Adoption
			Policy Adoption and Implementation Within 3 year of CAP Adoption
		Phase 1 Phase 2 Phase 3	Prepare Annual Report to Quantifying Program Participation and Findings Completed (Y/N)

Development Project Review Checklist

For proposed land use development projects, proponents shall complete the CAP Project Review Checklist. The Project Review Checklist is designed to assess consistency with GHG reduction measures identified in Chapter 3. The CAP and Project Review Checklist are intended as living documents. The City may amend the Project Review Checklist as adoption of policies and ordinances identified in **Table 19** establish more refined criteria.

Table 19 Project Review Checklist

Checklist Item	Inclusion
Project Information	
Applicant: ____ Project Name: ____ Project Number: ____ Property Address: ____ Project Area: ____ acres Proposed Uses: Single-family Residential ____ units Multi-family Residential ____ units Commercial ____ square feet Industrial ____ square feet Other ____ square feet Project Description: ____ ____ ____	
Smart Growth	
1. Is the project located within an existing or potential SANDAG smart growth opportunity area (SGOA)?	☐ Yes ☐ No ☐ N/A
If "Yes" proceed to Item 2 of the Checklist If "No" proceed to Item 3 of the Checklist	
2. Do the proposed land use densities meet or exceed SANDAG's minimum target densities? *Town Center SGOA Target Densities* *20 dwelling units per acre; or* *30 employees per acre; or* *Combination thereof* *Mixed-Use Transit Corridor SGOA Target Densities* *24 dwelling units per acre; or* *Any density commercial development;* *Community Center SGOA Target Densities* *20 dwelling units per acre; or* *Any density commercial development*	☐ Yes ☐ No ☐ N/A
If "Yes" the project is consistent with Smart Growth Land Use; Skip to Item 4 of the Checklist; If "No" proceed to Item 3 of the Checklist	
3. Does the project propose land use that is consistent with, or less GHG-intensive than, the existing General Plan Land Use Designation?	☐ Yes ☐ No ☐ N/A
If "Yes" the project is consistent with Smart Growth Land Use; If "No" proceed to Item 4 of the Checklist	
~~4. Does the project propose to purchase carbon offset credits that would result in lesser net GHG emissions than the existing General Plan Land Use Designation?~~	~~☐ Yes~~ ~~☐ No~~ ~~☐ N/A~~
~~If "Yes" the project is consistent with Smart Growth Land Use;~~ ~~If "No" the project is could conflict with Smart Growth Land Use~~ ~~*Mitigation through purchase of carbon offset credits shall only be considered with input from City staff including the Climate Action Planning Team. Carbon offset credits must represent voluntary local reduction measures that achieve long-lived reductions. As feasible, preference will be given to like-for-like offsets (for example, increased transportation emissions shall be offset by transportation reduction measures).*~~	

Table 19 Project Review Checklist	
Alternative-Fueled Vehicle Infrastructure	
4~~5~~. For single-family residential projects, does the project include prewiring to allow for future electric vehicle charging stations in the garage or driveway of each residence? For multi-family residential projects, does the project include prewiring to allow for future electric vehicle charging stations in all garages and 5 percent of resident and visitor parking spaces (2 minimum)? For commercial or industrial projects, does the project include prewiring to allow for future electric vehicle charging stations in 10 percent of surface parking spaces (2 minimum) and include immediate installation of charging stations at half of these prewired parking spaces?	☐ Yes ☐ No ☐ N/A
Alternative-Fueled Vehicle Parking	
5~~6~~. For commercial or industrial projects, does the project include reserved parking for clean air vehicles at 12 percent of parking spaces?	☐ Yes ☐ No ☐ N/A
Transportation Demand Management	
6~~7~~. For commercial or industrial projects that would generate more than 100 vehicle commute trips per day, does the project include a minimum of10 points of transportation demand management strategies? *[Transportation demand management strategies will be expanded in TDM Ordinance*] Employee Rideshare Programs (4 points per project) Secure Bicycle End-trip Facilities (i.e. secure parking, lockers, and showers) (2 points per project) Improvements to Adjacent Bicycle Lane (2 points per project) Pedestrian/Bicycle Connections to Off-site Paths (1 point per project) Unbundled Parking Pricing/ Employee Parking Cash-Out Programs (2 points per $20 monthly cash-out) Discounted Transit Program (2 points per $0.75 of subsidy) Roadway Safety improvements (e.g. curb bulb-outs, raised pedestrian crossings, count-down signal timers, chicanes, raised medians, etc.) (1 point per feature/intersection) Improvements to Nearby Transit Stops (i.e. improved shelters, benches, and street lighting) (1 point per stop)	☐ Yes ☐ No ☐ N/A
Energy Efficiency	
7~~8~~. For projects that include more than 50 surface parking spaces - Does the project incorporate on-site renewable energy sources capable of offsetting at least 50 percent of forecasted electricity demand?	☐ Yes ☐ No ☐ N/A
Recycled Water	
8~~9~~. Does the project incorporate service connections for immediate or future recycled water use? *Recycled water may be feasible for landscape, agricultural, or natural system irrigation, recreational impoundment, industrial processes, or for toilet or urinals.*	☐ Yes ☐ No ☐ N/A
Tree Canopy	
9~~10~~. Does the project promote a walkable environment through incorporation of shade trees in parking lots, recreation areas, and along frontage?	☐ Yes ☐ No ☐ N/A
If "Yes" for all checklist items, then the project is considered consistent with the CAP. If "No" for any checklist item, the project's GHG impact is significant. The project must incorporate each checklist item to the maximum extent feasible; however the project's GHG impact would remain significant.	

APPENDIX B

Geotechnical Studies

June 16, 2016

Project No. 16081-01

TO: Protea Senior Living Oceanside, LLC
18 Ventana Ridge Drive
Aliso Viejo, California 92656

ATTENTION: Mr. Hans van der Laan

SUBJECT: Preliminary Soil Investigation Report, Senior Living Development, Northwest of Cannon Road and Mystra Way, San Diego County, California

Introduction

In accordance with your authorization, GeoMat Testing Laboratories, Inc. has conducted a preliminary soil investigation for the subject site. Groundwater study or environmental site assessment is not part of this report. This report should be considered only preliminary in nature; its purpose is to determine the general foundation system for the structures described herein. The following presents a summary of our findings, conclusions, recommendations, and limitations of our work for the proposed construction.

If you should have any questions regarding this report, please do not hesitate to call our office. We appreciate this opportunity to be of service.

Submitted for GeoMat Testing Laboratories, Inc.

Haytham Nabilsi, GE 2375
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
HAYTHAM NABILSI
No. 2375
Exp. 12/31/16
GEOTECHNICAL
STATE OF CALIFORNIA

Frederick Schilling, CEG 2046
Engineering Geologist

REGISTERED GEOLOGIST
FREDRICK A. SCHILLING, JR
NO. EG 2046
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Distribution: [3] Addressee

ATTACHED MAPS AND APPENDICES

SCOPE OF WORK

- Review soils, seismic, groundwater data, and maps in our files.
- Exploration of the site at accessible location by means of a drill rig.
- Field engineer for logging, observe drilling resistance/caving.
- Sampling of select soils.
- Laboratory testing for classification, shear strength, expansion, and sulfate.
- Prepare CBC seismic design parameters.
- Preparation of a soil investigation report (3 copies) to include: Site preparation recommendations, Allowable soil bearing value, Foundation recommendations, Slab-on-grade recommendations, Earth pressures, Grading specifications, Pavement design, Site Class, CBC seismic design parameters, and cement type.

SITE CONDITIONS AND PROPOSED DEVELOPMENT

Site Condition

The subject site is currently a vacant lot that is located immediately north of the intersection of Cannon Road and Mystra Way, in the city of Oceanside. Both Cannon and Mystra are paved roads with fully developed concrete curb, gutter, and sidewalks. The site is generally rectangle in shape measuring approximately 575 feet long and 270 feet wide. Access on site is off Cannon Road, from a private paved road located on the northeastern border of the lot.

Several mature trees were noted along the northeastern border of the site along with several piles of dumped vegetation debris. Large cobbles and chunks of concrete were noted throughout the site.

The site had probably been mass graded in cut sometime in the past and currently has a relatively flat topography. Surface sheet flow is draining towards Mystra Way at rate of approximately 1.6 percent. To total relief on site is approximately 25 feet with the highest end located on the northeastern border on the access road and the lowest elevation located in the southern corner by the Cannon-Mystra intersection.

Proposed Development

We understand that the site is proposed for a senior living development and the associated streets, parking spaces, driveways, etc. The structures are assumed to be one or two story wood framed units. We anticipate that the proposed structures are to be supported by a combination of isolated square and continuous wall type foundations, and concrete slabs-on-grade. We have not been provided with specific foundation loads. We anticipate however, that continuous wall loads will not exceed 2500 pounds per linear foot and isolated column loads of up to 25 kips.

SUMMARY OF GEOTECHNICAL FINDINGS

Subsurface Exploration

Six exploratory boreholes were drilled on June 11, 2016, to a maximum depth of 15 feet below existing ground surface utilizing a CME 45 equipped with 6-inch hollows stem augers. A field engineer from this office observed the drilling and prepared the boring logs. Stratification lines on the logs represent the approximate boundary between soil types, although the transitions may actually be gradual. Refer to Plate 1 for location of exploratory boreholes.

Relatively undisturbed samples were obtained with the California Ring Sampler (ASTM D 1587). This sampler has three inches external diameter, 2.5 inches inside diameter, and is lined with one inch high brass rings, with an inside diameter of 2.41-inches. The sample barrel is driven into the ground at the bottom of the boring with 140-pound hammer with a free fall of approximately 30-inches.

Sampler driving resistance, expressed as blows per six inches of penetration, is presented on the boring logs at the respective sampling depths. Ring samples were retained in close-fitting, moisture tight canisters for transport to our laboratory for testing.

Additional representative samples have been recovered with the SPT (Standard Penetration Test, ASTM D 1586) sampler. This sampler consists of steel driving shoe and tube that split longitudinally in half, and a coupling at the top. The coupling connects the sampler to the drill rod. The standard split tube has an inside diameter of 1 3/8-inch (1 ½ -inch inside diameter without liners) and an outside diameter of 2-inches. Unless noted otherwise, liners are usually not used.

The standard driving weight and free fall for this test is similar to California Ring Sampler. Blow counts required to drive the samplers 18-inches are recorded on the boring logs. The sum of the number of blows for the last 12 inches on an 18-inch penetration represents the SPT count. This data is shown on the boring logs when obtained in the field.

A bulk sample was also collected from the auger cuttings during drilling. The sample was collected in a plastic bag, tied, and tagged for the location and depth.

The geotechnical boring logs are presented in Appendix B and may include a description and classification of each stratum, sample locations, blow counts, groundwater conditions encountered during drilling, results from selected types of laboratory tests, and drilling information.

Subsurface Findings

According to the California Geologic Survey, Geologic Map of the Oceanside 30'x60' Quadrangle, the site is mapped in an area of Tonalite bedrock classified as well graded sand with silt and gravel (USCS "SW-SM). This granitic material was dense to very dense, and brown, black, and white in color.

The bedrock in the majority of the site is overlain with sandstone material classified as silty sand (USCS "SM"). Other areas the bedrock is overlain with claystone/siltstone classified as dark brown sandy clay and reddish brown clayey sand (USCS "CL" and "SC").

Approximate depths to the granitic bedrock can be found in the following table.

Borehole No.	B1	B2	B3	B4	B5	B6
Depth to Bedrock (ft)	3	2	1	>15	5	5

Laboratory Testing

Laboratory moisture, density, sieve analysis, direct shear, expansion index, and sulfate, performed for a selected sample obtained from the boreholes. The soil classification is in conformance with the Unified Soil Classifications System (USCS), as outlined in the Classification and Symbols Chart (Appendix B). A graphical presentation of the test results is presented in Appendix C.

Groundwater

Groundwater study is not within the scope of this work. Groundwater was not encountered in our exploratory boring to a maximum depth of 15 feet below the ground surface. Due to the elevation of the site with respect to natural drainage courses, regional ground water is not expected to be a significant factor during construction of the proposed project.

Highest historical groundwater depths were researched using the State of California, Department of Water Resources and the USGS, National Water Information Systems and no pertinent information was available for the site.

Please note that the potential for rain or irrigation water locally seeping through from adjacent elevated areas and showing up near grades cannot be precluded. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. Fluctuations in perched and static water elevations are likely to occur in the future due to variations in precipitation, temperature, consumptive uses, and other factors including urbanization and development which were not present at the time our observations were made. Mitigation for nuisance shallow seeps will be needed if encountered. These mitigations may include subdrains, horizontal drains, toe drains, french drains, heel drains or other devices.

Soil Type

Highly weathered white sandstone: Soil Type “C”
Claystone/siltstone (sandy clay and clayey sand): Soil Type “B”
Granitic Bedrock: Stable Rock

Excavation Characteristics

The subgrade soil appears to be moderately dense to dense and very firm with dense to very dense granitic bedrock. Difficult excavation in bedrock may be encountered during rough grading, utility excavation, and foundation construction.

Temporary Excavations

General

All excavations must comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who should also be solely responsible for the means, methods, and sequencing of construction operations.

Safe Vertical Cut

Temporary un-surcharged excavations of 4 feet high may be made at a vertical gradient for short period of time. The overlaying sandstone may be highly weathered and could unravel or cave-in during excavations. Temporary un-surcharged excavations greater than 4 feet may be trimmed at 1.5H:1V gradient.

Exposed condition during construction should be verified by the project geotechnical engineer. No excavations should take place without the direct supervision of the project geotechnical engineer.

All applicable requirements of the California Construction and general Industry Safety Orders, the Occupational Safety and Health Act, and current amendments, and the Construction safety Act should be met. Cuts should be observed during excavation by the project's geotechnical consultant. If potentially unstable soil conditions are encountered, modifications of slope ratios for temporary cuts may be required.

Precaution for Excavations

The Contractor should be aware that unsupported excavation depths should in no case exceed those specified in local, state, and/or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations).

Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures.

Sloping the sides of temporary excavations should be required beyond the recommended safe cut where trench/excavation is expected to be left open for a long time or where trench/excavation is along foundation or where adjacent utilities exist or public right-of-way. Temporary excavation should not extend below a 1H:1V plane extending beyond and down from the bottom of the existing utility lines or structures.

Expansive Soil Characteristics

Based on laboratory testing, the upper foundation soil is classified as low in expansion potential (EI<50). This should be verified during construction to confirm the soil expansion potential.

Soil Corrosivity

Representative soil sample obtained from borehole cuttings was tested in the laboratory for soluble sulfate content. Based on the results, sulfate concentration is about 450 ppm (0.045%) in the tested soil sample. Therefore we recommend Type II cement for all concrete in contact with earth material.

Site Class

It is our opinion that structures should be designed in accordance with the current seismic building code as determined by the structural engineer. Considering the Spectral Response Acceleration at short period S_{DS} > 0.50g (CBC Table 1613.5.6(1), and the Spectral Response Acceleration at one second period S_{D1} >0.20g (CBC Table 1613.5.6(2), the subject site is located in an estimated Site Class "D" as outlined in CBC Table 1613.5.2.

Ground Motion And Seismic Design Parameters:

The peak ground acceleration (PGA) and 2013 CBC seismic design parameters are presented in Appendix D.

SUMMARY OF GEOLOGIC FINDINGS

Introduction

The I-5 Freeway cuts north-south through the region approximately 4 miles to the west. The town center of Oceanside is approximately in the same area. The Orange County – San Diego County line runs NE-SW through the region approximately 20 miles to the northwest.

See attached Figures 1 – 5 for location detail.

The following graphics review the setting and geology.

Topographic map, 1/100,000,
Street Map, ~1/24000,
Topographic Map, 1/6000,
Regional Physiographic Map,
Street Location,
Street Level Photo,
California Setting,
Fault Activity Map,
Regional Fault Map,
Geologic Map,

Regional Geologic Setting

The project site is located in north San Diego County, a coastal part of the Peninsular Ranges Geomorphic Province of Southern California. The province is generally thought of as characterized by belts of major northwest-southeast trending zones of faulting and high seismic activity. See attached Geomorphic Province Map of California, Figure 6.

Attached maps review the seismic setting of the property. The Newport Inglewood-Rose Canyon Fault Zone is the closest of the major faults. It is located a short distance off shore, approximately 2 miles southwest of the subject site. This fault is one of the principal earthquake faults of California. It is considered coextensive with the Rose Canyon Fault of the San Diego area. This concept provides great extent to the discontinuity, represented by the overall zone of possible fault activity. The magnitude potential of earthquakes generated by this fault is frequently given as seven (moment magnitude). However, this section of the fault zone has been determined inactive, see Figures 7-9.

Prospective ground motion from earthquakes is reviewed for the site (Lat/Long input) by the Ground Motion Interpolator of the California Geological Survey. The PGA for the site is 0.281g.

Bedrock of the item area is generally granitic.

Site Geology

The subject property setting is the hillside country, south of Camp Pendleton in San Diego County. The site is located east of the center of town and east of the I-5 Freeway. See Figures 1 – 5 and Figure 10 for further detail. The topographic setting of the property is terrain between the Coast Ranges of the area. The native terrain is underlain by Cretaceous, granitic rock, see Figure 7.

Geologic Hazards

Active faults

The site is not located within an Alquist-Priolo Earthquake Fault Zone. According to the California Department of Conservation, Fault Activity Map, the site is closely located to the Newport Inglewood-Rose Canyon Fault system. The Fault Zone is located approximately 2 miles, offshore, southwest of the site.

Ground Shaking

Although there are no known active surface faults within or adjacent to the site that will significantly impact the project, the project is located in a region with active earthquakes and strong seismic motion of those earthquakes could affect the project. The structures that are proposed to be constructed on the site will be required to meet and comply with all applicable city and State building codes to reduce seismic ground shaking at the site to less-than-significant.

Surface Rupture Zones

The site is not within a currently established Earthquake Fault Zone for surface fault rupture hazards. Therefore, the potential for surface rupture is very low. It is probable that not all-active or potentially active faults in the region have been identified. Furthermore, seismic potential of the smaller and less notable faults is not sufficiently developed for assignment of maximum magnitudes and associated levels of ground shaking that might occur at the site due to these faults.

Tsunamis, Seiches

A tsunami is a series of long period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The first order driving force for locally generated tsunamis offshore southern California is expected to be tectonic deformation from large earthquakes (Legg, *et al.,* 2002). According to the State of California, Tsunami Inundation Map, Oceanside Quadrangle, the site is not located within a tsunami inundation area.

A seiche is a run-up of water within a lake or embayment triggered by fault or landslide induced ground displacement. The site is not located near a body of water. Therefore, the potential of seiches affecting the site is considered very low.

Slope Stability

The existing slopes along the borders of Cannon Road and Mystra Way, are estimated at 2.5H:1V or flatter and as high as approximately eight feet. These slopes are considered grossly stable. No other slopes are proposed.

Landslides

The site and the surrounding properties are flat and not prone to slope instability hazards, such as landslides. The project will not be impacted by a landslide or impact adjacent properties due to a project generated landslide.

Liquefaction

According to the City of Oceanside's General Plan, the site is not located in an area prone to liquefaction.

CONCLUSIONS

- Disturbed soil, fill, utility lines, irrigation lines, roots, and any deleterious materials would require removal from the proposed construction area. Cleaning excavated bottoms from underground obstruction should be an important consideration.

- Based on laboratory testing, the expansion potential of the near-surface soils at the site is expected to be low. This would require verification for the building pad subsequent to completion of rough grading.

- The use of shallow foundation appears feasible for the proposed construction.

- The overall geologic situation of the item property is satisfactory for the use intended, providing are followed the recommendations of foundation design.

- The site is expected to be subject to moderate to strong ground shaking from a regional seismic event within the projected life of the proposed structure.

- No groundwater and/or seepage were encountered during our subsurface investigation. However, the potential for rain or irrigation water moving through from adjacent and elevated areas cannot be precluded. Our experience indicates that surface or near-surface groundwater conditions can develop in areas where groundwater conditions did not exist prior to site development, especially in areas where a substantial increase in surface water infiltration results from landscape irrigation. We therefore recommend that local landscape irrigation and landscape irrigation from surrounding areas be kept to the minimum necessary to maintain plant vigor and that any leaking pipes/sprinklers, etc. should be promptly repaired. We have no way of predicting depth to the groundwater which may fluctuate with seasonal changes and from one year to the next. Subdrains, horizontal drains, French drains or other devices may be recommended in future for graded areas that exhibit nuisance seepage.

RECOMMENDATIONS

Building Pad Preparation

All grading should be performed in accordance with our General Earthwork and Grading Specifications presented in Appendix E except as modified within the text of this report. All debris, abandoned utility lines, irrigation appurtenances, underground structures, deleterious materials, etc., should be removed and hauled offsite. Cavities created during site clearance should be backfilled in a controlled manner.

Any fill and loose soil should be traced and removed. Removal may be extended deeper if loose soil is encountered in work areas. Where possible, the lateral extent of excavated area should be at least 5 feet around all building pads.

Subsequent to site clearance, proposed building pad areas should be overexcavated to a depth of at least 5 feet to expose competent native soil. Depth of overexcavation is taken from existing grade or proposed grade, whichever is deeper.

After overexcavation, the exposed surfaces should be scarified to a depth of at least 12-inches, watered and recompacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557 Test Method; prior to placement of fill. Deeper overexcavation, especially to remove loose soils or deleterious material, may be required depending upon field observations of excavation bottom by the soil engineer or his representative.

Compacted Fills/Imported Soils

Any soil to be placed as fill, whether presently onsite or import, should be approved by the soil engineer or his representative prior to their placement. All onsite soils to be used as fill should be cleansed of any roots, or other deleterious materials.

All fills should be placed in 6- to -8 inch loose lifts, thoroughly watered, or aerated to near optimum moisture content, mixed and compacted to at least 90 percent relative compaction. This is relative to the maximum dry density determined by ASTM D1557 Test Method.

Any imported soils should be sandy (preferably USCS "SM" or "SW", and very low in expansion potential) and approved by the soil engineer. The soil engineer or his representative should observe the placement of all fill and take sufficient tests to verify the moisture content and the uniformity and degree of compaction obtained.

Conventional Shallow Foundation

The use of shallow spread footings in firm native ground or compacted fill is feasible. Recommended maximum allowable bearing value and minimum depth of footing for wood frame residential buildings is as follows.

Structure	Minimum Depth of Footing (below lowest firm grade and slab on grade)	Maximum Allowable Soil Bearing Value
One Story	12 in	1500 psf
Two Story	18 in	2000 psf

- Footing reinforcement should be determined by the structural engineer; however, minimum reinforcement should be at least two No. 4 reinforcing bars, top and bottom.

- Expansion potential of foundation soils should be verified subsequent to footing excavation and before placement of footing material.

- The above recommended bearing value may be increased by one third for temporary (wind or seismic) loads.

Resistance to lateral footing will be provided by passive earth pressure and base friction. For footings bearing against compacted fill or firm native material, passive earth pressure may be considered to be developed at a rate of 243 psf per foot of depth to a maximum of 2000 psf. Base friction may be computed at 0.39 times the normal load. If passive earth pressure and friction are combined to provide required resistance to lateral forces, the value of the passive pressure should be reduced to two-thirds the value.

Foundations should be designed by a qualified structural engineer. Foundation design comes under the purview of the structural engineer. These recommendations should not preclude more restrictive structural requirements. The structural engineer should determine the actual footing sizes and reinforcement to resist vertical, horizontal, and uplift forces under static and seismic conditions. Reinforcement and size recommendations presented in this report are considered the minimum necessary for the soil conditions present at foundation level and are not intended to supersede the design of the project structural engineer or criteria of the governing agencies for the project.

Reinforcement and size recommendations presented in this report are considered the minimum necessary for the soil conditions present at foundation level and are not intended to supersede the design of the project structural engineer or criteria of the governing agencies for the project.

Retaining Walls

The following lateral earth pressures and soil parameters in conjunction with the above allowable soil bearing value for shallow foundation may be used for design of conventional retaining walls with free draining compacted backfills.

If passive earth pressure and friction are combined to provide required resistance to lateral forces, the value of the passive pressure should be reduced to two-thirds the following recommendations.

Active Earth Pressure with level backfill (P_a)	40 psf (EFP) drained, yielding
At Rest Pressure (P_0)	59 psf (EFP), drained, non-yielding (part of building wall)
Passive Earth Pressure (P_p)	243 psf (EFP), drained, maximum of 2000 psf
Horizontal Coefficient of Friction (μ)	0.39
Unit Soil Weight (γ_t)	120 pcf

All retaining walls and block wall footings should be founded in competent or compacted soil. We recommend drainage for retaining walls to be provided in accordance with the attached Plate 2. Drainage pipes and ditches should be connected to an approved drainage device. Maximum precautions should be taken when placing drainage materials and during backfilling. Wall backfill should be properly compacted to at least 90 percent relative compaction. Back-cut distance behind the top of wall should be at least 18 inches or other practical distance to facilitate compaction.

Total Settlement

The foundation will be embedded into compacted fill. Native soils below the fill possess relatively high strengths and will not be subject to significant stress increases from the foundations of the new structure. Therefore settlements are expected to be within tolerable limits. Total long-term settlement between similarly loaded adjacent foundation systems should not exceed one inch. The structures should be designed to tolerate a differential settlement on the order of 1/2 to 3/4-inch.

Interior Concrete Flatwork

Interior slabs-on-grade may be at least four inches thick (5 inches for storage areas), reinforced with at least No 4 bars at 12-inches on-center both ways, properly centered in mid thickness of slabs. Slab-on-grades should be underlain with four inches of sand. If moisture intrusion is objectionable, the concrete slab should be provided by a 10-mil Visqueen moisture barrier placed and sealed over the sand.

Slab-on-grade thickness and reinforcement should be evaluated by the structural engineer and designed in compliance with applicable codes. Excess soils generated from foundation excavations should not be placed on any building pads without proper moisture and compaction. All slab subgrades should be verified to be saturated to a depth of 12 inches prior to placement of slab building materials. Moisture content should be tested in the field by the soil engineer. Slabs subgrade should be kept moist and the surface should not be allowed to desiccate.

The addition of fiber mesh in the concrete and careful control of water/cement ratios may lessen the potential for slab cracking. In hot or windy weather, the contractor must take appropriate curing precautions after the placement of concrete.

The use of mechanically compacted low slump concrete (not exceeding 4 inches at the time of placement) is recommended. We recommend that a slipsheet (or equivalent) be utilized if grouted tiles or other crack sensitive flooring (such as marble tiles) is planned directly on concrete slabs.

Site Drainage

Positive drainage should be provided and maintained for the life of the project around the perimeter of all structures and all foundations toward streets or approved drainage devices to minimize water infiltrating into the underlying natural and engineered fill soils, and prevent erosion from slopes.

In addition, finish subgrade adjacent to exterior footings should be sloped down (at least 2%) and away to facilitate surface drainage. Roof drainage should be collected and directed away from foundations via nonerosive devices. Water, either natural or by irrigation, should not be permitted to pond or saturate the foundation soils or slopes.

Planter areas and large trees adjacent to the foundations are not recommended. All planters should be provided with drainage devices. Location of drainage device should be in accordance with the design civil engineers drainage and erosion control recommendations.

The owner should be made aware of the potential problems, which may develop when drainage is altered through construction of walls and other devices. Ponded water, leaking irrigation systems, over watering or other conditions which could lead to ground saturation should be avoided. Surface and subsurface runoff from adjacent properties should be controlled. Area drainage collection should be directed toward the existing street through approved drainage devices. All drainage devices should be properly maintained.

Slope Protection And Maintenance

Proper slope protection and maintenance should help minimize erosion and improve the stability of the existing slopes. As a minimum the slope maintenance guidelines presented in Appendix F should be followed. Additional precautions are:

1. Recommendations for slope planting should be provided by a qualified landscape architect. GeoMat Testing Laboratories, Inc. strongly recommends that erosion control measures should be maintained.

2. It is critical to provide periodic maintenance and repair of all slopes and drainage systems. Surficial drainage system should be designed by the project civil engineer. Drainage system inlets, outlets, and spillways should be periodically inspected and cleaned of soil and debris.

3. It is recommended that all project landscaping be provided with automatic sprinkler shutoffs in order to help prevent over-saturation of slope faces and help mitigate surficial slope instability problems. Leaks in the irrigation system should be fixed without delay.

4. The slopes should be periodically inspected for evidence of cracking, erosion, and burrowing animals. Any problems should be repaired immediately.

Trench Backfill

All utility trenches and retaining wall backfills should be mechanically compacted to the minimum requirements of at least 90 percent relative compaction. Onsite soils derived from trench excavations can be used as trench backfill except for deleterious materials. Soils with sand equivalent greater than 30 may be utilized for pipe bedding and shading. Pipe bedding should be required to provide uniform support for piping. Excavated material from footing trenches should not be placed in slab-on-grade areas unless properly compacted and tested.

Tentative Asphalt Pavement

On the basis of classifications of onsite soils, an assumed Traffic Indices, and estimated R-value of 25, the minimum recommended pavement thickness is as follows:

Location	Traffic Index	Minimum Recommended Pavement Section
Auto Parking	4.0	2.5” AC over 5.0” Class 2 Base
Delivery and Refuse Truck Drives	5.0	2.5” AC over 7.5” Class 2 Base

The upper twelve inches of pavement subgrade should be scarified, watered and compacted to at least 90 percent of the maximum density as determined by ASTM D1557 test method. Aggregate base should be compacted to at least 95 percent of the maximum density as determined by ASTM D1557 test method.

Final pavement design recommendations should be based on laboratory test results of representative pavement subgrade soils upon the completion of rough grading.

Tentative Concrete Pavement

For auto stalls a 5.5 inch concrete is recommended. For the driveway a 6.5 inches of concrete is recommended. Pavement subgrade should be saturated to a depth of 12 inches and compacted to at least 90 percent relative compaction. Saturated subgrade should be tested for moisture by the soil engineer.

Concrete pavement should be air entrained Portland Cement Concrete Pavement and must have a minimum 28-day flexural strength of 570 psi (compressive strength of approximately 4000 psi).

No reinforcing is necessary. Joint design and spacing should be in accordance with ACI recommendations. Construction joints should contain dowels or be tongue and grooved to provide load transfer. Tie bars are recommended on the joints adjacent to unsupported edges. Maximum joint spacing in feet should not exceed 2 to 3 times the thickness in inches. Joint sealing with a quality silicone sealer is recommended to prevent water from entering the subgrade allowing pumping and loss of support.

Proper subgrade preparation and joint sealing will reduce (but not eliminate) the potential for slab movements (thus cracking) on native soils. Frequent jointing will reduce uncontrolled cracking and increase the efficiency of aggregate interlock joint transfer.

Trash Enclosure

The trash enclosure slab should consist of a minimum 4 inches concrete over a minimum 4 inches of compacted Class 2 aggregate base. At a minimum, the trash enclosure slab should be reinforced with #4 rebars (both ways) at 12-inch center-to-center spacing. The required slab thickness and reinforcement should be designed by the project structural engineer. Shrinkage control and construction joints should be considered by the trash enclosure slab designer.

Based on our previous experience, there is a tendency for early pavement damage in front of the trash enclosure area, where heavy wheel loads are concentrated in the same location. To enhance the durability of this paved area and reduce maintenance costs, a concrete stress apron consisting of a minimum 8 inches concrete over a minimum 12 inches of compacted Class 2 aggregate base. Concrete pavement should be air entrained Portland Cement Concrete Pavement and must have a minimum 28-day flexural strength of 570 psi (compressive strength of approximately 4000 psi). At a minimum, the concrete apron pavement should be reinforced with #4 rebar (both ways) at 12-inch center-to-center spacing. Shrinkage control and construction joints should be considered by the PCC pavement designer.

The apron should be installed to cover the front of the enclosure and extend out an additional 8 feet minimum from the enclosure opening. The aggregate base should be placed in thin lifts in a manner to prevent segregation; uniformly moisture conditioned to near optimum moisture content, and compacted to at least 95 percent relative compaction to provide a smooth, unyielding surface. The upper 12 inches of subgrade under the concrete stress apron should be saturated, tested for saturation, and re-compacted to at least 90 percent relative compaction.

We Should be Retained for Plan Reviews

The recommendations provided in this report are based on preliminary information and subsurface conditions as interpreted from limited exploratory trenches at the site. We should be retained to review final grading and foundation plans to revise our conclusions and recommendations, as necessary. Professional fees will apply for each review.

Our conclusions and recommendations should also be reviewed and verified during site grading, and revised accordingly if exposed geotechnical conditions vary from our preliminary findings and interpretations.

Additional Observation and/or Testing

GeoMat Testing Laboratories, Inc. should observe and/or test at the following stages of construction.

- During overexcavation and backfills.
- Following footing excavation and prior to placement of footing materials.
- During wetting of slab subgrade and prior to placement of slab materials.
- During all trench and wall backfill.
- When any unusual conditions are encountered.

Final Report of Compaction During Grading

A final report of compaction control should be prepared subsequent to the completion of grading. The report should include a summary of work performed, laboratory test results, and the results and locations of field density tests performed during grading.

GEOTECHNICAL RISK

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned.

The engineering recommendations presented in the preceding sections constitute GeoMat Testing Laboratories professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and GeoMat Testing Laboratories experience in working with these conditions.

LIMITATION OF INVESTIGATION

This report was prepared for the exclusive use of the owner and project team. The use by others, or for the purposes other than intended, is at the user’s sole risk. Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers practicing in this or similar locations within the limitations of scope, schedule, and budget. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The field and laboratory test data are believed representative of the site; however, soil conditions can vary significantly. As in most projects, conditions revealed during construction may be at variance with preliminary findings. If this condition occurs, the possible variations must be evaluated by the Project Geotechnical Engineer and adjusted as required or alternate design recommended.

This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractor carry out such recommendations in the field.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.

The findings, conclusions, and recommendations presented herein are based on our understanding of the project and on subsurface conditions observed during our site work, and are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In additions, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In additions, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge.

DELORME

Topo USA® 6.0

TN

MN (11.8°E)

Figure 1

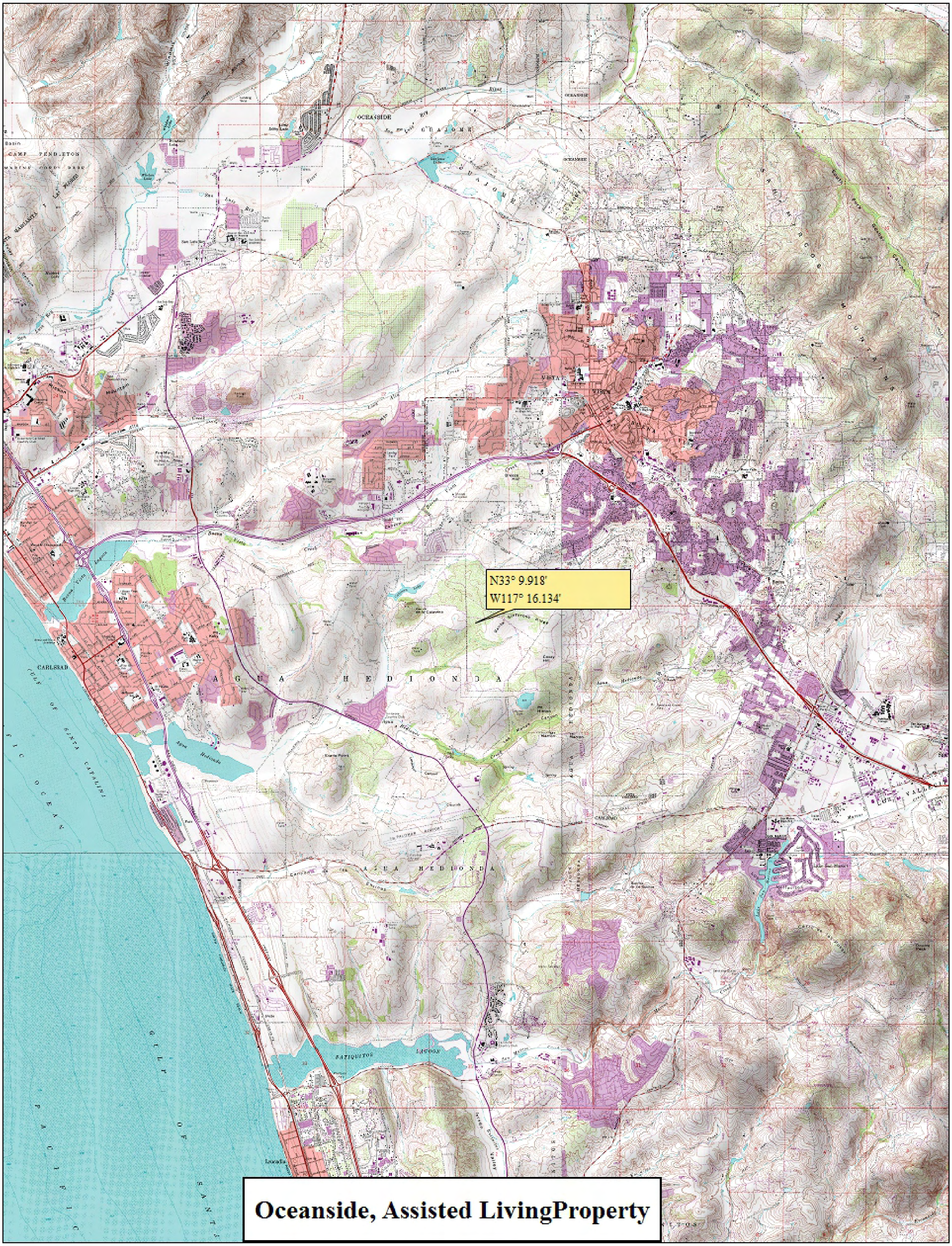
Scale 1 : 25,000

0 600 1200 1800 2400 3000 ft

0 200 400 600 800 1000 m

1" = 2,083.3 ft

Data Zoom 13-0



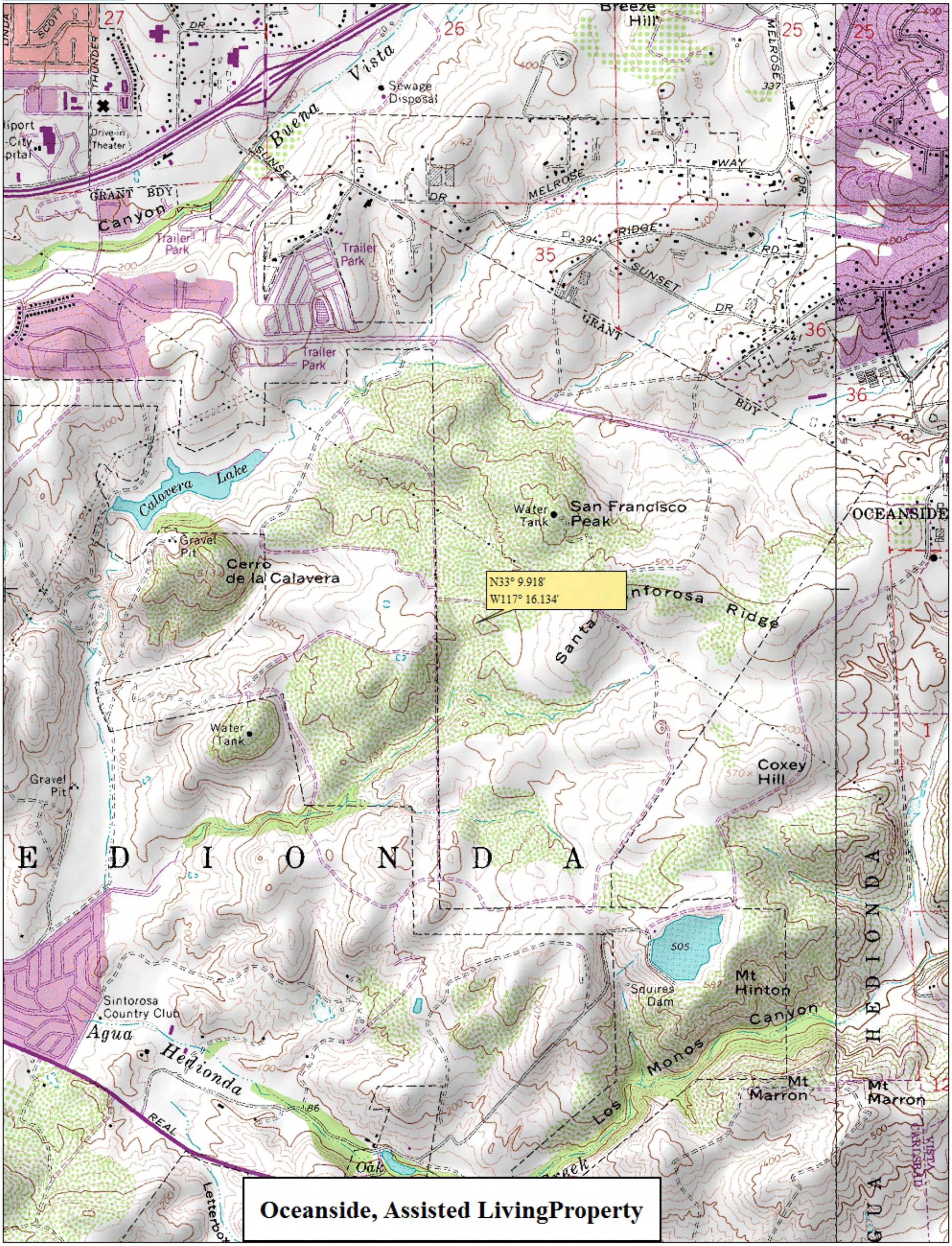
MN (11.8° E)

0 ½ 1 1½ 2 2½ mi

Data Zoom 11-0

Figure 2

DELORME XMap® 8

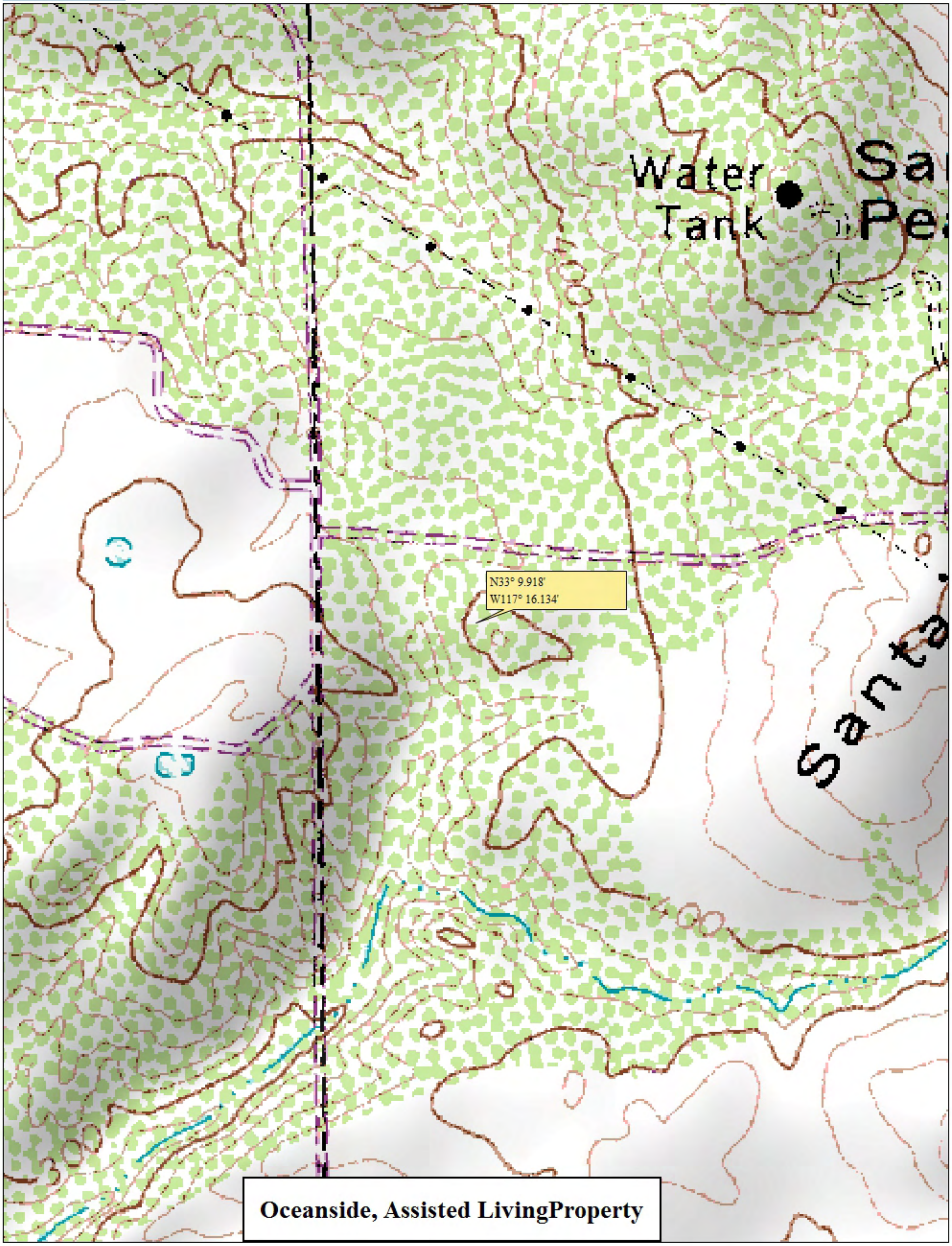


MN (11.8° E)

Figure 3

0 600 1200 1800 2400 3000 3600 ft

Data Zoom 13-1



Oceanside, Assisted LivingProperty

MN (11.8° E)

0 180 360 540 720 900 ft

Data Zoom 15-1

Figure 4

Figure 5 Site, street level

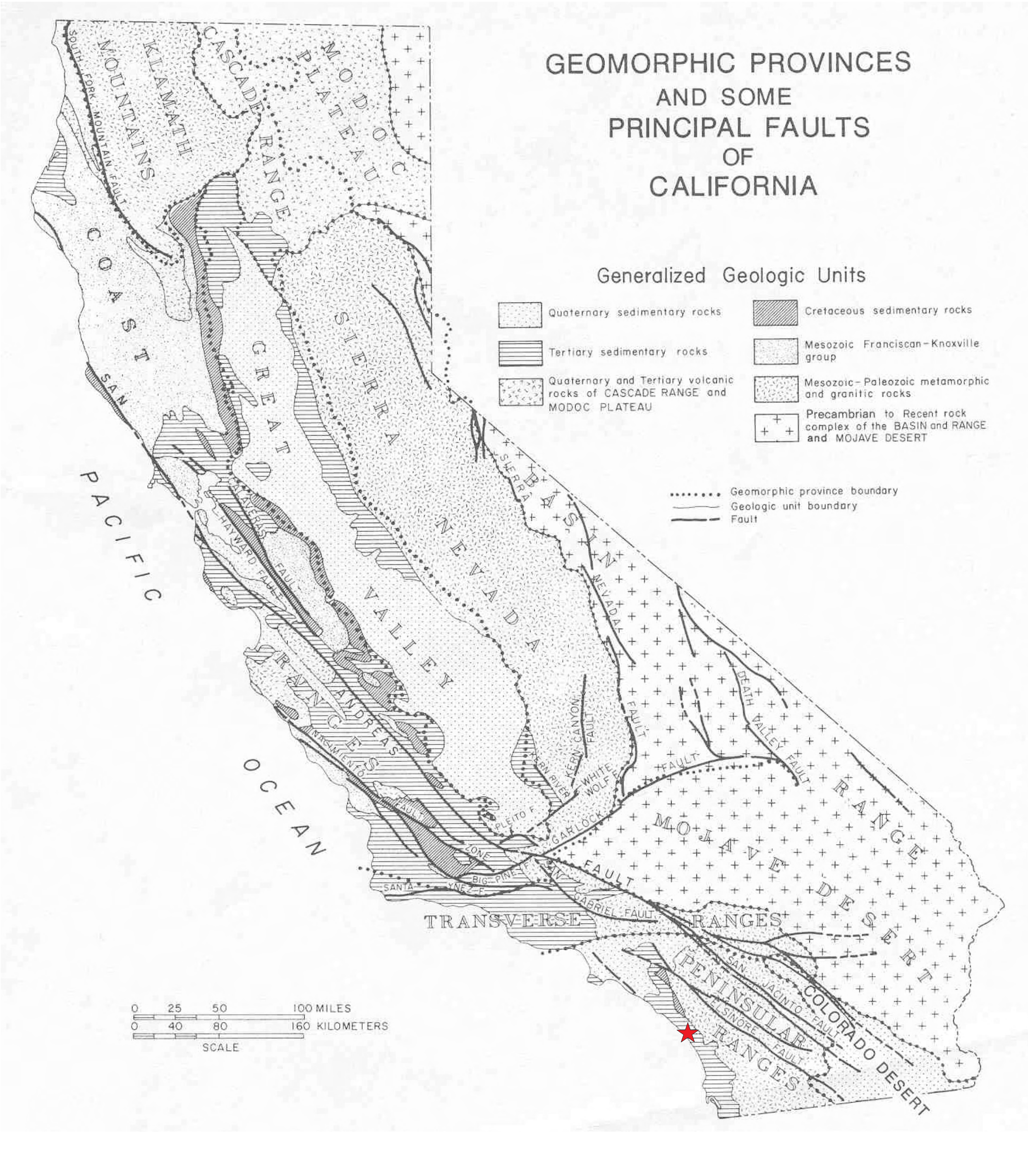
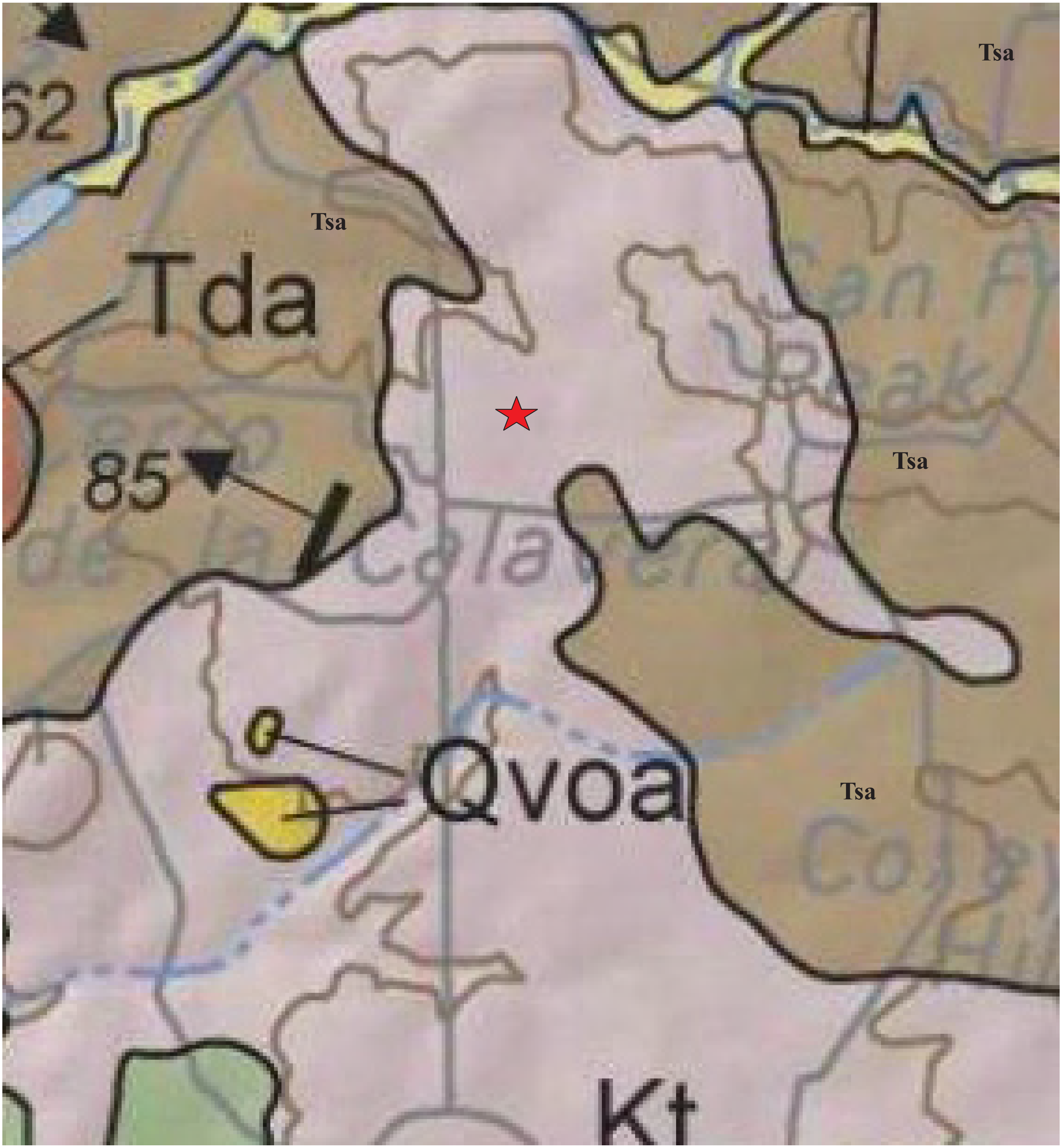


Figure 6 **CALIFORNIA SETTING**

SITE ★

SOURCE: CDMG., Note 36.



Qvoa - Pleistocene, flood plain deposits.
Tsa - Eocene, Santiago Fm; Sandstone.
Kt - Cretaceous, granitic rock.

GEOLOGIC MAP

Site ★

Figure 7

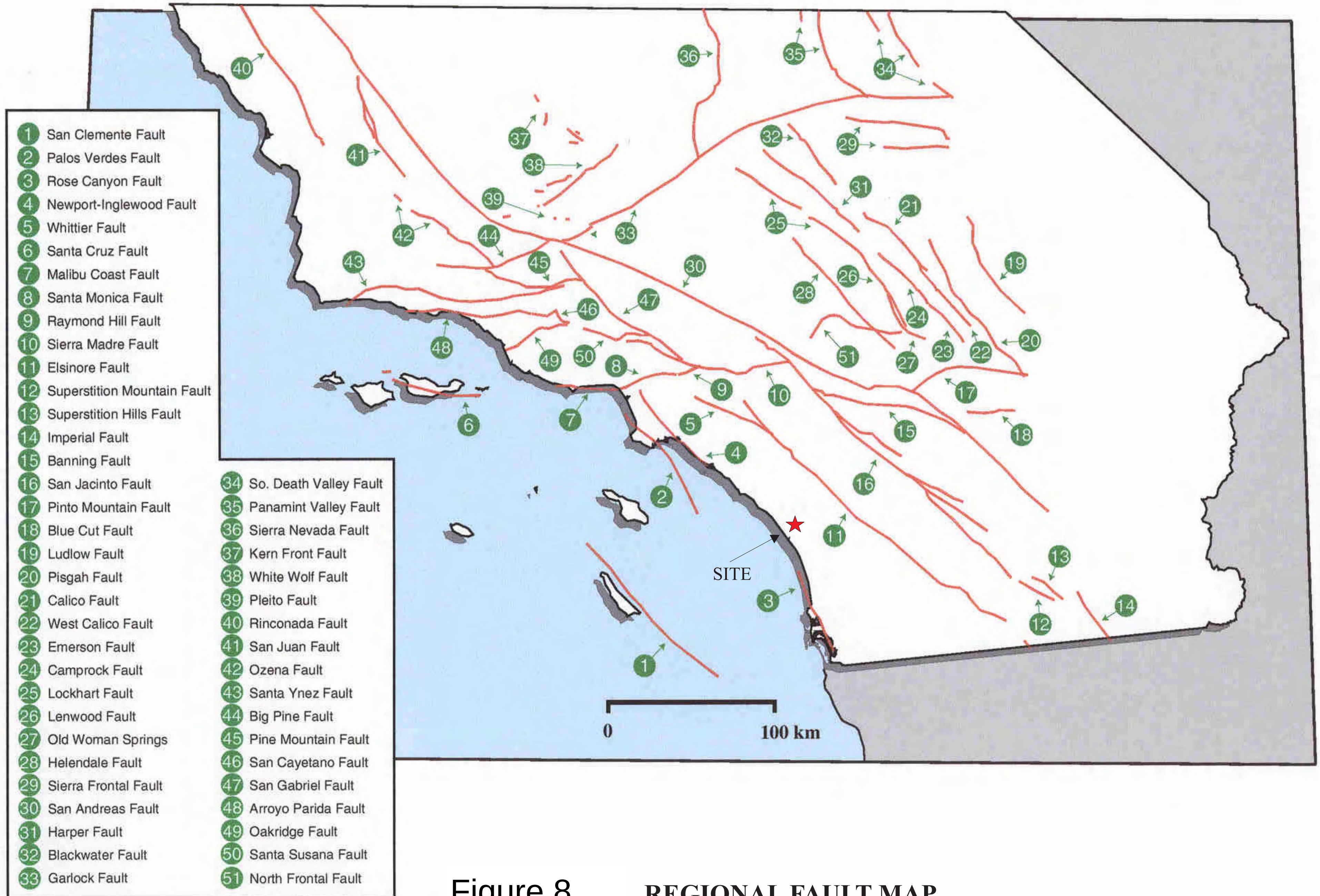


Figure 8 **REGIONAL FAULT MAP**

Source: USGS. Website.

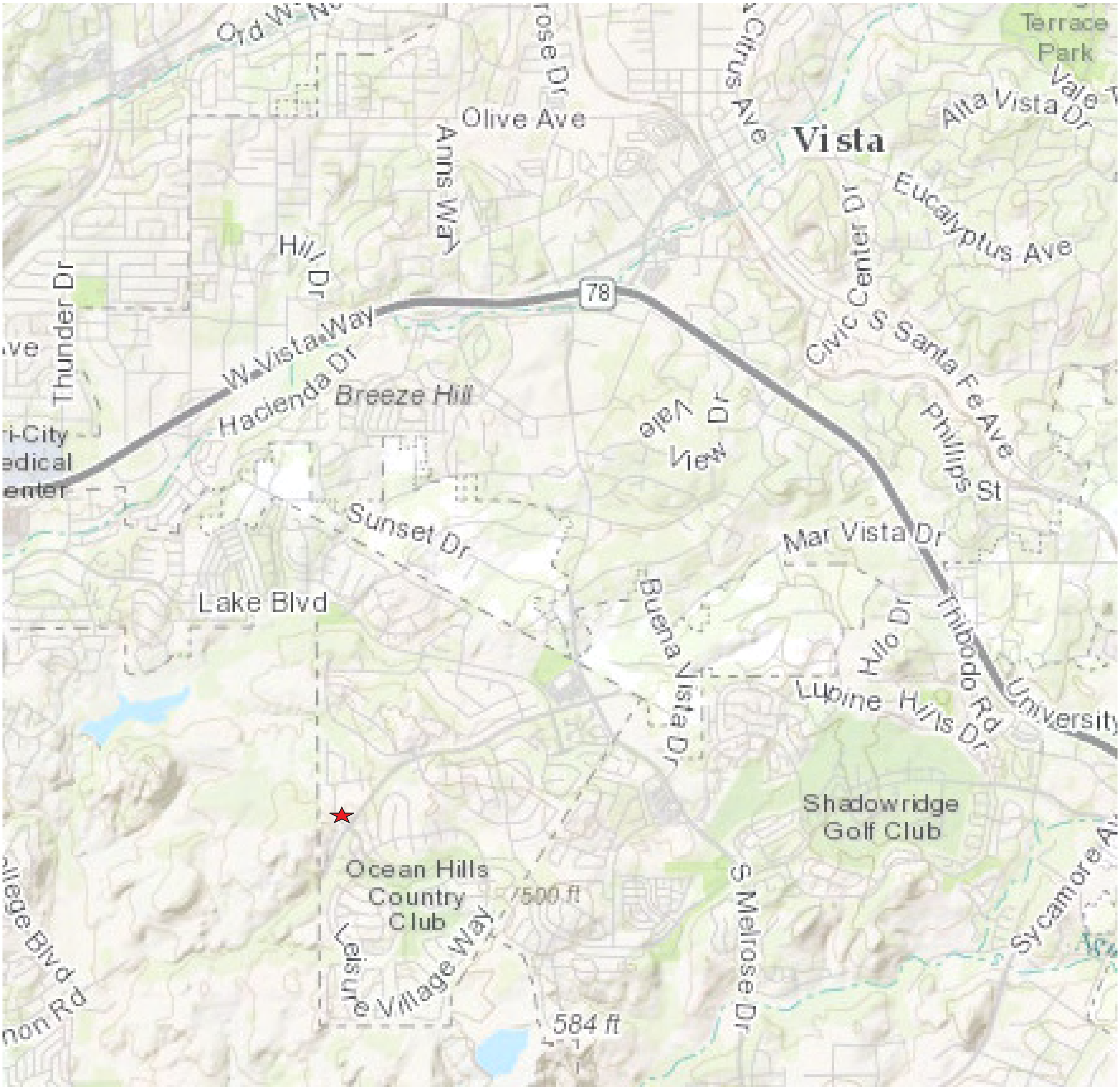
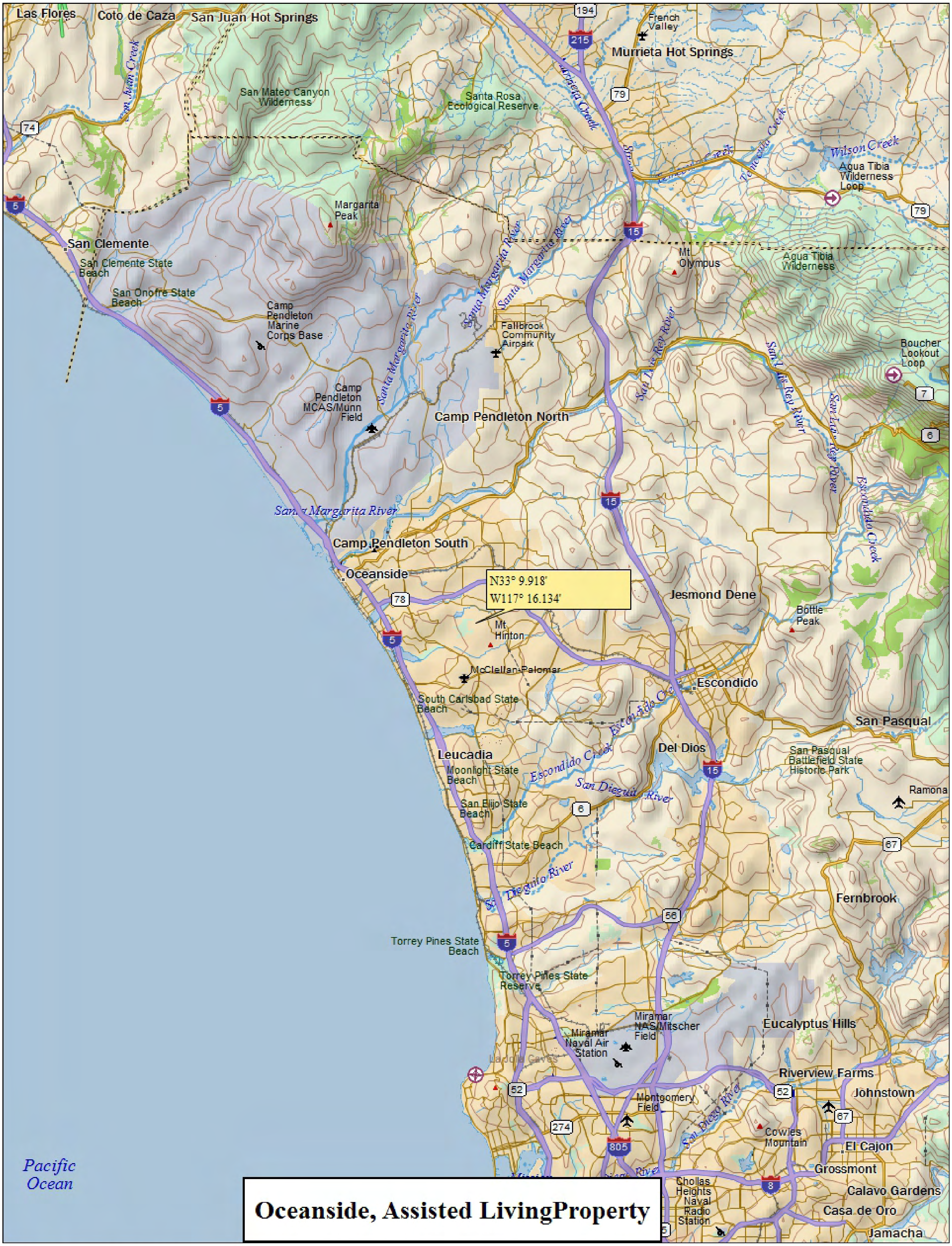


Figure 9 **FAULT ACTIVITY MAP, SITE AREA**

Notation: No active faults are identified.



Oceanside, Assisted LivingProperty

MN (11.8° E)

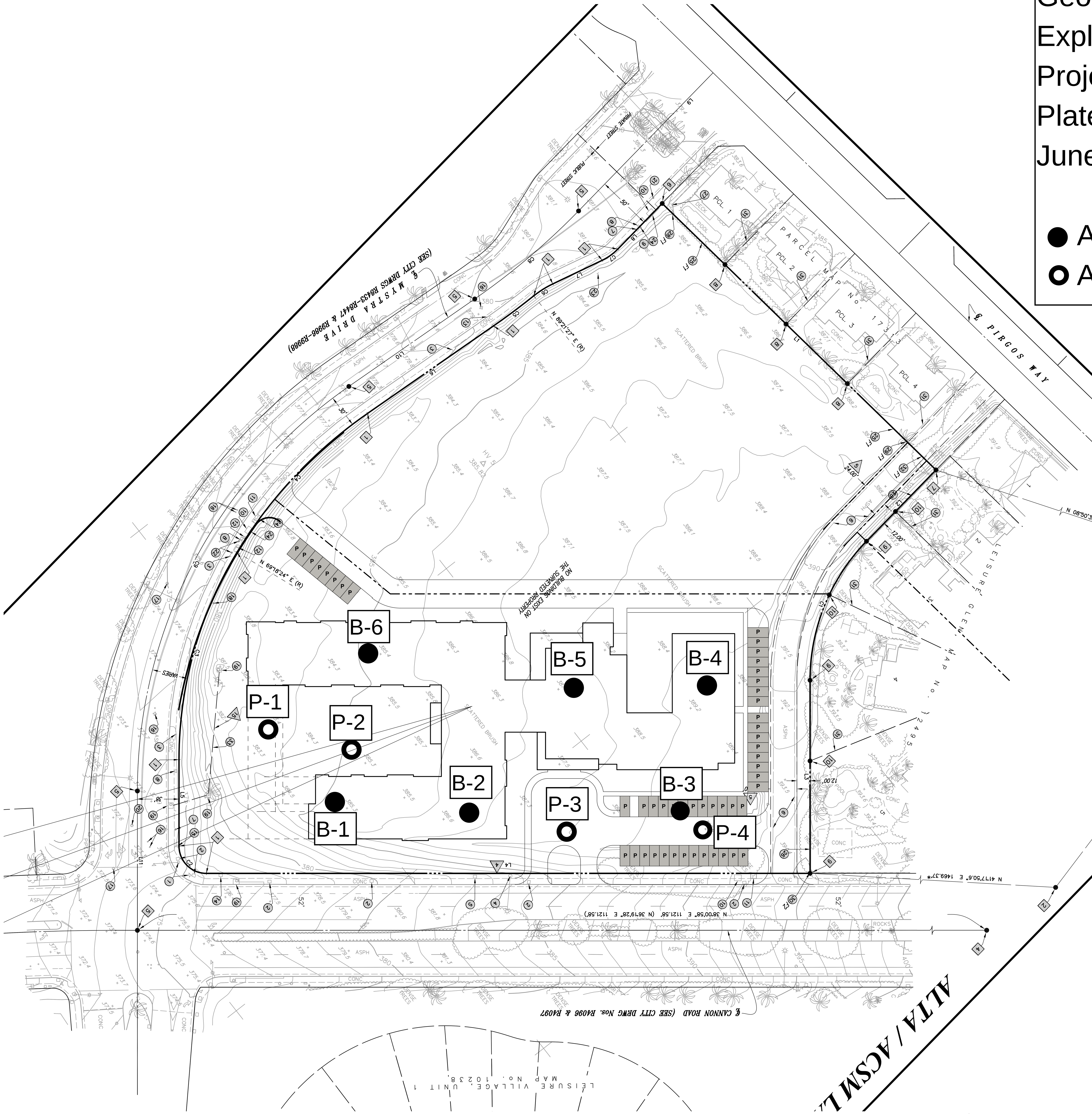
Figure 10

0 2 4 6 8 10 mi

Data Zoom 9-0

GeoMat Testing Laboratories, Inc.
Exploratory Borehole/Infiltration Test Location Map
Project No. 16081-01
Plate 1
June 13, 2016

● Approximate Location of Exploratory Borehole
○ Approximate Location of Infiltration Test



01 Site Plan
SCALE: 1" = 40'

IPA IRWIN PARTNERS ARCHITECTS
245 Fischer Avenue, Suite B-2 Costa Mesa CA 92626
(714) 557 2448 www.ipaoc.com
ARCHITECTURE PLANNING CONSULTING

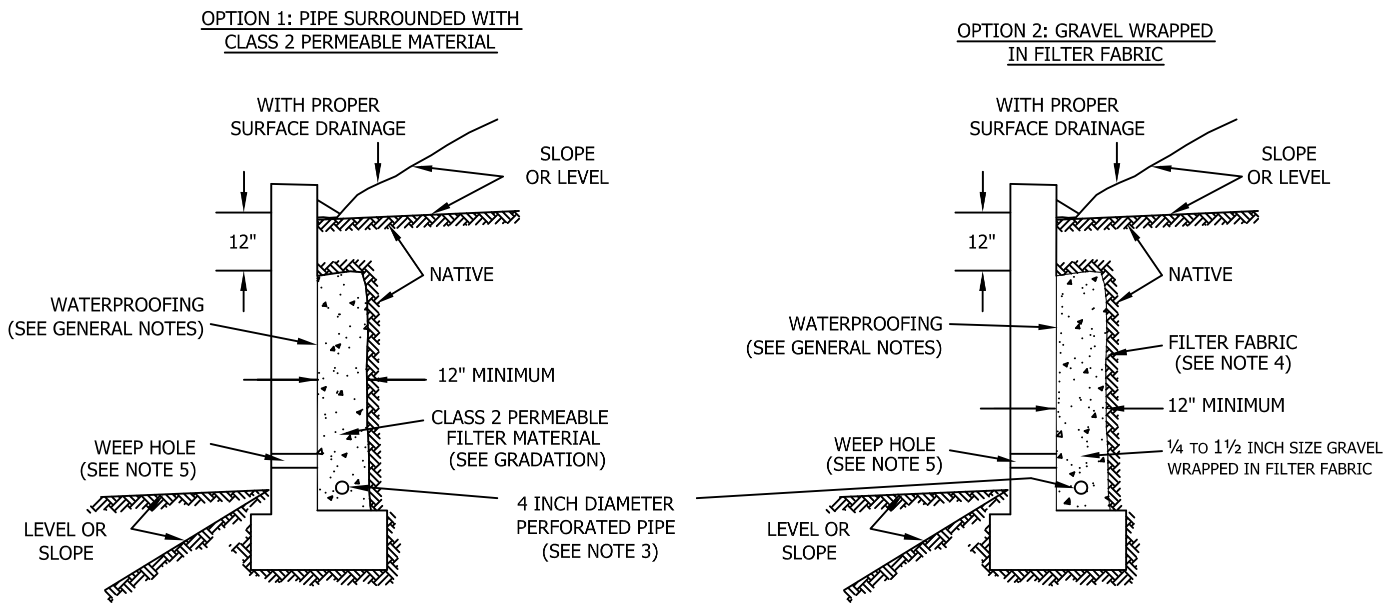
Oceanside Senior Living
Protea Capital Resources

Cannon Rd & Mystra Way
Oceanside, CA 92056

Site Plan
A1

PROJECT NO: 16005
PLOT DATE: 6/9/2016
16005 Oceanside SD (4)g.pln

SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

Plate 2

Appendix A

REFERENCES

Kennedy, M.P., Tan, S.S., Bovard, K.R., Alvarez, R.M., Watson, M.J., and Gutierrez, C.I., 2007, Geologic map of the Oceanside 30x60-minute quadrangle, California: California Geological Survey, Regional Geologic Map No. 2, scale 1:100,000

City of Oceanside General Plan, Public Safety Element.

State of California, Tsunami Inundation Map for Emergency Planning, Oceanside Quadrangle, San Luis Rey Quadrangle, June 1, 2009.

State of California Department of Water Resources.

USGS, Groundwater Information System.

Department of the Navy, Design Manual 7.01, Soil Mechanics, September 1986.

Department of the Navy, Design Manual 7.02, Foundation and Earth Structures, September 1986.

California Geological Survey, Interactive Ground Motion Map, Peak Ground Acceleration (10 percent of being exceeded in 50 years).

USGS, Seismic Hazard Curves, Response Parameters, and Design Parameters.

Alam Singh, Modern Geotechnical Engineering, Third Edition.

Department of the Army, US Army Corps of Engineers, Engineering and Design, Bearing Capacity of Soils, EM 1110-1-1905.

Principals of Foundation Design, Braja Das.

Foundation Analysis and Design, Ed. 5 by Joseph E. Bowles.

Robert Day, Geotechnical Engineer’s Portable Handbook.

Robert Day, Geotechnical Foundation Handbook.

BIBLIOGRAPHY

Association of Engineering Geologists, Southern California Section, Special Publication, Geology, Seismicity, and Environmental Impact, 1973.

Association of Engineering Geologists, Southern California Section, Special Publication 4, Engineering Geology Practice in Southern California, 1992.

Bell, F. G. (Ed.), 1994, Engineering in Rock Masses: Oxford, London, Boston, Butterworth-Heinemann Ltd (member Reed Elsevier group), 580p.

CDMG, 2005, Geologic Map of the Oceanside 30' x 60' Quadrangle, Regional Geologic Map Series.

CGS, 2008, Ground Motion Interpolator, digital input of seismicity, from digital input of site location.

CDMG, Alquist Priolo Zones, Southern California, CD-ROM and website.

CGS, 2010 Fault Activity Map of California.

C.G.S. Map Sheet 48 (Revised), *Earthquake Shaking Potential Map of California*, December 23, 2008.

CDMG, Note 36, Geomorphic Provinces and Some Principal Faults of California, 1986.

Grant, Lisa B., and others, 1999, Late Quaternary Uplift and Earthquake Potential of the San Joaquin Hills, Southern Los Angeles Basin, Calif.: Geology, v. 27, no.11, p. 1031-1034.

GSA., Geology of North America, V. G-3, the Cordilleran Orogen: Conterminous U.S., 1992.

GSA., Memoir 178, the San Andreas Fault System: Displacement, Palinspastic Reconstruction, and Geologic Evolution, 1993.

Slosson, J. E., and others (Eds.), 1992, Landslides/Landslide Mitigation: Geol. Soc. Am. Reviews in Engineering Geology, V. IX, 120p.

USGS, Professional Paper 1515, The San Andreas Fault System, Calif., 1990.

USGS, 1989, MF-1964, Map Showing Late Quaternary Faults and 1978-84 Seismicity of the Los Angeles Region, California.

Varnes, David J., 1978, Slope Movement and Types and Processes in Landslides: Analysis and Control, Transportation Research Board, National Academy of Sciences, Wash D. C., Sp. Rpt. 176, Chap. 2.

Websites: CDMG, USGS, SCEDC, USGS & AASG.

Appendix B

GeoMat

General Notes

DRILLING NOTES

WATER LEVEL MEASUREMENTS

Water levels indicated on the boring logs are levels measured in the borings at the times indicated. In permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with only short-term observations.

WATER LEVEL OBSERVATION DESIGNATION

W.D.	While Drilling
A.B.	After Boring
B.C.R.	Before Casing Removal
A.C.R.	After Casing Removal
24 hr.	Water level taken approximately 24 hrs. after boring completion

DRILLING AND SAMPLING SYMBOLS

AS	Auger Sample
CS	Continuous Sampler
DB	Diamond Bit -NX unless otherwise noted
HA	Hand Auger
HS	Hollow Stem Auger
PA	Power Auger
RB	Rock Bit
SS*	Split-Barrel
ST	Shelby Tube - 2" (51mm) unless otherwise noted
WB	Wash Bore
CR	Calfornia Ring Sampler 3" O.D., Lined with 2.5"X1" Rings

*The Standard Penetration Test is conducted in conjunction with the split-barrel sampling procedure. The "N" value corresponds to the number of blows required to drive the last 1 foot (0.3m) of an 18 in. (0.46m) long, 2 in. (51mm) O.D. split-barrel sampler with a 140 lb. (63.5 kg) hammer falling a distance of 30 in. (0.76m). The Standard Penetration Test is carried out according to ASTM D-1586. (See "N" Value below.)

SOIL PROPERTIES & DESCRIPTIONS

TEXTURE

PARTICLE	SIZE	
Clay	< 0.002 mm	(< 0.002 mm)
Silt	< #200 Sieve	(0.075 mm)
Sand	#4 to #200 Sieve	(4.75 to 0.075 mm)
Gravel	3 in. to #4 Sieve	(75 mm to 4.75 mm)
Cobbles	12 in. to 3 in.	(300 mm to 75 mm)
Boulders	> 12 in.	(300 mm)

COMPOSITION

SAND & GRAVEL

Description	% by Dry Weight
trace	< 15
with	15 - 29
modifer	> 30

FINES

Description	% by Dry Weight
trace	< 5
with	5 - 12
modifier	> 12

Soil descriptions are based on the Unified Soil Classification System (USCS) as outlined in ASTM Designations D-2487 and D-2488. The USCS group symbol shown on the boring logs correspond to the group names listed below. The description includes soil constituents, consistency, relative density, color and other appropriate descriptive terms. Geologic description of bedrock, when encountered, also is shown in the description column.

GROUP SYMBOL	GROUP NAME	GROUP SYMBOL	GROUP NAME
GW	Well Graded Gravel	CL	Lean Clay
GP	Poorly Graded Gravel	ML	Silt
GM	Silty Gravel	OL	Organic Clay or Silt
GC	Clayey Gravel	CH	Fat Clay
SW	Well Graded Sand	MH	Elastic Silt
SP	Poorly Graded Sand	OH	Organic Clay or Silt
SM	Silty Sand	PT	Peat
SC	Clayey Sand	CL-CH	Lean to Fat Clay

COHESIVE SOILS

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (Qu) (psf)	(kPa)
Very Soft	< 500	(< 24)
Soft	500 - 1000	(24 - 48)
Medium	1001 - 2000	(48 - 96)
Stiff	2001 - 4000	(96 - 192)
Very Stiff	4001 - 8000	(192 - 383)
Hard	> 8001	(> 383)

PLASTICITY

Description	Liquid Limit (%)
Lean	< 45%
Lean to Fat	45 to 49%
Fat	≥ 50%

Cohessive Soils

Consistenacy	"N" value
Very Soft	<2
Soft	2-4
Medium	4-8
Stiff (Firm)	8-15
Very Stiff (Very Firm)	15-30
Hard	>30

COHESIONLESS SOILS

RELATIVE DENSITY	"N" VALUE*
Very Loose	0 - 3
Loose	4 - 9
Medium Dense	10 - 29
Dense	30 - 49
Very Dense	≥ 50

BEDROCK PROPERTIES & DESCRIPTIONS

ROCK QUALITY DESIGNATION (RQD)**

DESCRIPTION OF ROCK QUALITY	RQD (%)
Very Poor	0 - 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90
Excellent	90 - 100

**RQD is defined as the total length of sound core pieces, 4 inches (102mm) or greater in length, expressed as a percentage of the total length cored. RQD provides an indication of the integrity of the rock mass and relative extent of seams and bedding planes.

DEGREE OF WEATHERING

Slightly Weathered	Slight decomposition of parent material in joints and seams.
Weathered	Well-developed and decomposed joints and seams.
Highly Weathered	Rock highly decomposed, may be extremely broken.

SOLUTION AND VOID CONDITIONS

Solid	Contains no voids.
Vuggy	Containing small pits or cavities < 1/2" (13mm).
Porous	Containing numerous voids which may be interconnected.
Cavernous	Containing cavities, sometimes quite large.

When classification of rock materials has been estimated from disturbed samples, core samples and petrographic analysis may reveal other rock types.

HARDNESS & DEGREE OF CEMENTATION

LIMESTONE

Hard	Difficult to scratch with knife.
Moderately Hard	Can scratch with knife but not with fingernail.
Soft	Can be scratched with fingernail.

SHALE

Hard	Can scratch with knife but not with fingernail.
Moderately Hard	Can be scratched with fingernail.
Soft	Can be molded easily with fingers.

SANDSTONE

Well Cemented	Capable of scratching a knife blade.
Cemented	Can be scratched with knife.
Poorly Cemented	Can be broken apart easily with fingers.

BEDDING CHARACTERISTICS

TERM	THICKNESS (inches)	THICKNESS (mm)
Very Thick Bedded	> 36	> 915
Thick Bedded	12 - 36	305 - 915
Medium Bedded	4 - 12	102 - 305
Thin Bedded	1 - 4	25 - 102
Very Thin Bedded	0.4 - 1	10 - 25
Laminated	0.1 - 0.4	2.5 - 10
Thinly Laminated	< 0.1	< 2.5

Bedding Planes	Planes dividing the individual layers, beds or strata of rocks.
Joint	Fracture in rock, generally more or less vertical or transverse to the bedding.
Seam	Applies to bedding plane with an unspecified degree of weathering.

BORHOLE LOG BH-1

Sheet	1 OF 1		
Date	6/11/2016		
Project No.	16081-01	Drilling Rig	CME 45
Project	Protea Senior Living	Sampler	Cal Mod. And SPT
Client	Protea Senior Living	Method	Hollow Stem
Location	SWC of Cannon Road & Mystra Way, Oceanside, CA	Hammer Type	140 lb
Coodinate		Surface Elev.	
Notes		Total Depth	6'

Type/Symbol	Casing	Split Spoon	Ring Sampler	Cutting
I.D.		S	R	C
O.D.				
Length				
Hammer Wt.				
Hammer Fall				

Date	Time	Water Depth (ft)	Casing Size (in)	Casing Depth (ft)	Hole Depth (ft)	Symbol
6/11/2016		None				

Depth Below Surface (ft)	Elevation (ft)	Graphic	Soil Sample Type	Number	Symbol	Depth	Blows 0-152.4 mm	152.4-304.8 mm	304.8-457.2 mm	N-Value	N60	(N1)60	VISUAL MATERIAL CLASSIFICATION AND REMARKS	Moisture (%)	Dry Density (pcf)	Test
0													**SANTIAGO FORMATION (SC)**			
1													white sandstone with traces of brown clay drills like SC			
2													tops of large cobbles noted at existing subgrade elevation			
3			R				17	52/6"		45			**GRANITIC BEDROCK (SW-SM)**	9	117	
4													drills like well-graded sand with gravel, dense			
5			S				29	50/5"		89			very dense	3		
6													% Passing No. 200 Sieve = 11			
7																
8																
9													Practical Drilling Refusal @ 6'			
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

BORHOLE LOG BH-2

Sheet	1 OF 1		
Date	6/11/2016		
Project No.	16081-01	Drilling Rig	CME 45
Project	Protea Senior Living	Sampler	Cal Mod. And SPT
Client	Protea Senior Living	Method	Hollow Stem
Location	SWC of Cannon Road & Mystra Way, Oceanside, CA	Hammer Type	140 lb
Coodinate		Surface Elev.	
Notes		Total Depth	3'

Type/Symbol	Casing	Split Spoon	Ring Sampler	Cutting
I.D.		S	R	C
O.D.				
Length				
Hammer Wt.				
Hammer Fall				

Date	Time	Water Depth (ft)	Casing Size (in)	Casing Depth (ft)	Hole Depth (ft)	Symbol
6/11/2016		None				

Depth Below Surface (ft)	Elevation (ft)	Graphic	Soil Sample Type	Number	Symbol	Depth	Blows 0-152.4 mm	152.4-304.8 mm	304.8-457.2 mm	N-Value	N60	(N1)60	VISUAL MATERIAL CLASSIFICATION AND REMARKS	Moisture (%)	Dry Density (pcf)	Test
0													SANTIAGO FORMATION (SC)			
1													white sandstone with traces of brown clay drills like SC			
2			S				23	50/3"		123_			GRANITIC BEDROCK (SW-SM)			
3													drills like well-graded sand with gravel			
4													very dense			
5																
6																
7																
8																
9													Practical Drilling Refusal @ 3'			
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

BORHOLE LOG — BH-3

Sheet	1 OF 1		
Date	6/11/2016		
Project No.	16081-01	**Drilling Rig**	CME 45
Project	Protea Senior Living	**Sampler**	Cal Mod. And SPT
Client	Protea Senior Living	**Method**	Hollow Stem
Location	SWC of Cannon Road & Mystra Way, Oceanside, CA	**Hammer Type**	140 lb
Coodinate		**Surface Elev.**	
Notes		**Total Depth**	5'

Type/Symbol	Casing	Split Spoon	Ring Sampler	Cutting
I.D.		S	R	C
O.D.				
Length				
Hammer Wt.				
Hammer Fall				

Date	Time	Water Depth (ft)	Casing Size (in)	Casing Depth (ft)	Hole Depth (ft)	Symbol
6/11/2016		None				

Depth Below Surface (ft)	Elevation (ft)	Graphic	Soil Sample Type	Number	Symbol	Depth	Blows 0-152.4 mm	152.4-304.8 mm	304.8-457.2 mm	N-Value	N60	(N1)60	VISUAL MATERIAL CLASSIFICATION AND REMARKS	Moisture (%)	Dry Density (pcf)	Test
0													SANTIAGO FORMATION (SC)			
1													white sandstone with traces of brown clay drills like SC			
2			S				7	12	12	24			medium dense, % Passing No. 200 Sieve = 24	9		
3													SANTIAGO FORMATION (CL)			
4			S				9	11	30	41			GRANITIC BEDROCK (SW-SM)			
5													drills like well-graded sand with gravel			
6													dense			
7																
8																
9													Practical Drilling Refusal @ 5'			
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

BORHOLE LOG BH-4

Project No.	16081-01	Sheet	1 OF 1
		Date	6/11/2016
Project	Protea Senior Living	Drilling Rig	CME 45
Client	Protea Senior Living	Sampler	Cal Mod. And SPT
Location	SWC of Cannon Road & Mystra Way, Oceanside, CA	Method	Hollow Stem
Coodinate		Hammer Type	140 lb
Notes		Surface Elev.	
		Total Depth	15'

Type/Symbol	Casing	Split Spoon	Ring Sampler	Cutting
I.D.		S	R	C
O.D.				
Length				
Hammer Wt.				
Hammer Fall				

Date	Time	Water Depth (ft)	Casing Size (in)	Casing Depth (ft)	Hole Depth (ft)	Symbol
6/11/2016		None				

Depth Below Surface (ft)	Elevation (ft)	Graphic	Soil Sample Type	Number	Symbol	Depth	Blows 0-152.4 mm	152.4-304.8 mm	304.8-457.2 mm	N-Value	N60	(N1)60	VISUAL MATERIAL CLASSIFICATION AND REMARKS	Moisture (%)	Dry Density (pcf)	Test
0													SANTIAGO FORMATION (SC)			
1													white sandstone with traces of brown clay drills like SC			
2													tops of large cobbles noted at existing subgrade elevation			
3			R				32	34	38	47			dense			
4													sample disturbed, some brown clay in sample			
5			S				9	9	11	20			SANTIAGO FORMATION (CL)			
6													dark brown to dark reddish brown sandy clay			
7													very firm	10		
8													% Passing No. 200 Sieve = 53			
9																
10			R				22	35	50/ 3"	88			CLAYEY SAND (SC)	10	123	
11													medium brown to reddish brown clayey sand			
12													very dense			
13													% Passing No. 200 Sieve = 34			
14																
15			S				22	29	33	62			very dense			
16																
17																
18																
19																
20																
21																
22																
23																
24																

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

BORHOLE LOG BH-5

Sheet	1 OF 1		
Date	6/11/2016		
Project No.	16081-01	Drilling Rig	CME 45
Project	Protea Senior Living	Sampler	Cal Mod. And SPT
Client	Protea Senior Living	Method	Hollow Stem
Location	SWC of Cannon Road & Mystra Way, Oceanside, CA	Hammer Type	140 lb
Coodinate		Surface Elev.	
Notes		Total Depth	6'

Type/Symbol	Casing	Split Spoon	Ring Sampler	Cutting
I.D.		S	R	C
O.D.				
Length				
Hammer Wt.				
Hammer Fall				

Date	Time	Water Depth (ft)	Casing Size (in)	Casing Depth (ft)	Hole Depth (ft)	Symbol
6/11/2016		None				

Depth Below Surface (ft)	Elevation (ft)	Graphic	Soil Sample Type	Number	Symbol	Depth	Blows 0-152.4 mm	152.4-304.8 mm	304.8-457.2 mm	N-Value	N60	(N1)60	VISUAL MATERIAL CLASSIFICATION AND REMARKS	Moisture (%)	Dry Density (pcf)	Test
0													**SANTIAGO FORMATION (SC)**			
1													white sandstone with traces of brown clay drills like SC			
2													tops of large cobbles noted at existing subgrade elevation			
3			R				11	13	25	25			**SANTIAGO FORMATION (CL)**	11		
4													reddish to medium brown sandy clay, very firm			
5			S				32	38	49	87			**GRANITIC BEDROCK (SW-SM)**			
6													very dense			
7																
8																
9													Practical Drilling Refusal @ 6'			
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

BORHOLE LOG BH-6

Sheet	1 OF 1		
Date	6/11/2016		
Project No.	16081-01	Drilling Rig	CME 45
Project	Protea Senior Living	Sampler	Cal Mod. And SPT
Client	Protea Senior Living	Method	Hollow Stem
Location	SWC of Cannon Road & Mystra Way, Oceanside, CA	Hammer Type	140 lb
Coodinate		Surface Elev.	
Notes		Total Depth	6'

Type/Symbol	Casing	Split Spoon	Ring Sampler	Cutting
I.D.		S	R	C
O.D.				
Length				
Hammer Wt.				
Hammer Fall				

Date	Time	Water Depth (ft)	Casing Size (in)	Casing Depth (ft)	Hole Depth (ft)	Symbol
6/11/2016		None				

Depth Below Surface (ft)	Elevation (ft)	Graphic	Soil Sample Type	Number	Symbol	Depth	Blows 0-152.4 mm	152.4-304.8 mm	304.8-457.2 mm	N-Value	N60	(N1)60	VISUAL MATERIAL CLASSIFICATION AND REMARKS	Moisture (%)	Dry Density (pcf)	Test
0													SANTIAGO FORMATION (SC)			
1													white sandstone with traces of brown clay drills like SC			
2													tops of large cobbles noted at existing subgrade elevation			
3													hard drilling at 2'			
4																
5			S				58/6"			116_			GRANITIC BEDROCK (SW-SM)			
6													very dense			
7																
8																
9													Practical Drilling Refusal @ 6'			
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																

The stratification lines represent the approximate boundary lines between soil and rock types. In-situ, the transition may be gradual.

Appendix C

LABORATORY TESTING

INTRODUCTION

The contents of this appendix shall be integrated with the geotechnical engineering study of which it is a part. The data contained in this appendix shall not be used in whole or in part as a sole source for information or recommendations regarding the subject site. Not all of the tests included in the following list have been performed on this project.

LABORATORY ANALYSIS

Laboratory tests were performed on selected driven ring or SPT and bulk soil samples to estimate engineering characteristics of the various earth materials encountered. Testing was performed in general accordance with ASTM Standards for Soil Testing. The results of the laboratory analyses are summarized in this Appendix.

Laboratory Moisture and Density Determinations

Moisture content and dry density determinations were performed on selected driven ring samples collected by California Ring Split Spoon Sampler (ASTM D1587) to evaluate the natural water content and dry density of the various soils encountered in accordance with ASTM D2216 and part of D2937. The results are presented on the respective drill-hole logs.

Sieve Analysis and Hydrometer

Laboratory sieve analysis and hydrometer were performed on selected bulk, driven ring, or split spoon samples collected to evaluate the grain size distribution of the various soils encountered in accordance with ASTM D422. The graphical results are presented in this Appendix.

Atterberg Limits Tests

Atterberg limits tests were performed on selected samples. Liquid and plastic limits were determined in accordance with standard test method ASTM D4318. The test results are shown on Plasticity Chart in this Appendix and may be also be listed on the respective drill-hole logs.

Direct Shear Tests.

Direct shear tests were performed on a selected driven ring sample to evaluate the shear strength of the earth materials. The tests were performed in accordance with standard test method ASTM D-3080. Summary plots of the direct shear data are presented in this Appendix. Residual shear strength was obtained by re-shearing the samples.

Compaction Tests

Compaction tests were performed on selected samples of the onsite soils to assess their compaction characteristics. The tests were performed in accordance with ASTM D1557 and the results are presented in this Appendix.

R-Value Tests

R-value tests were performed on selected samples of surficial earth material. The test was performed in accordance with standard test method ASTM D2844 or CT-301 and test results is in this Appendix.

Expansion Index Tests

Expansion Index tests were performed on selected samples of the near-surface soils to estimate the expansion characteristics. The test was performed in general accordance with Uniform Building Code (UBC) Standard No. 29-2, Expansion Index Test Method. The results are presented in this Appendix.

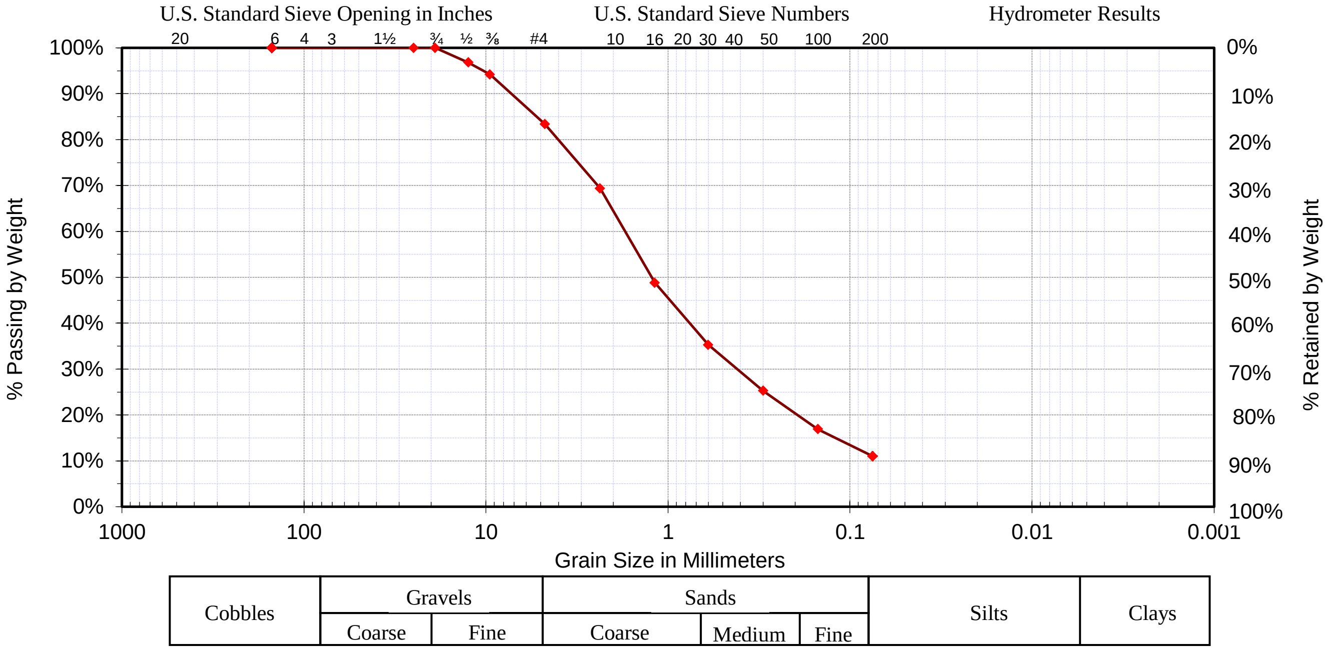
Soil Chemistry Tests/Corrosion Tests

soil chemistry tests were performed on select samples to evaluate one or all of the following properties: resistivity (ASTM G57), pH (ASTM D1293), sulfate (Hach), and chloride (Hach). The results of the testing and opinion on corrosivity to pipe and concrete materials are summarized in the text. The laboratory output is presented in this Appendix.

Odometer Consolidation-Swell Test

This can be used to determine consolidation (ASTM D2435) and swelling (ASTM D4546) parameters.
Consolidation tests were performed on samples, within the brass ring, to predict the soils behavior under a specific load. Porous stones are placed in contact with top and bottom of the samples to permit to allow the addition or release of water. Loads are applied in several increments and the results are recorded at selected time intervals. Samples are tested at field and increased moisture content. The results are plotted on the Consolidation Test Curve and the load at which the water is added is noted on the drawing.

LABORATORY TEST RESULTS

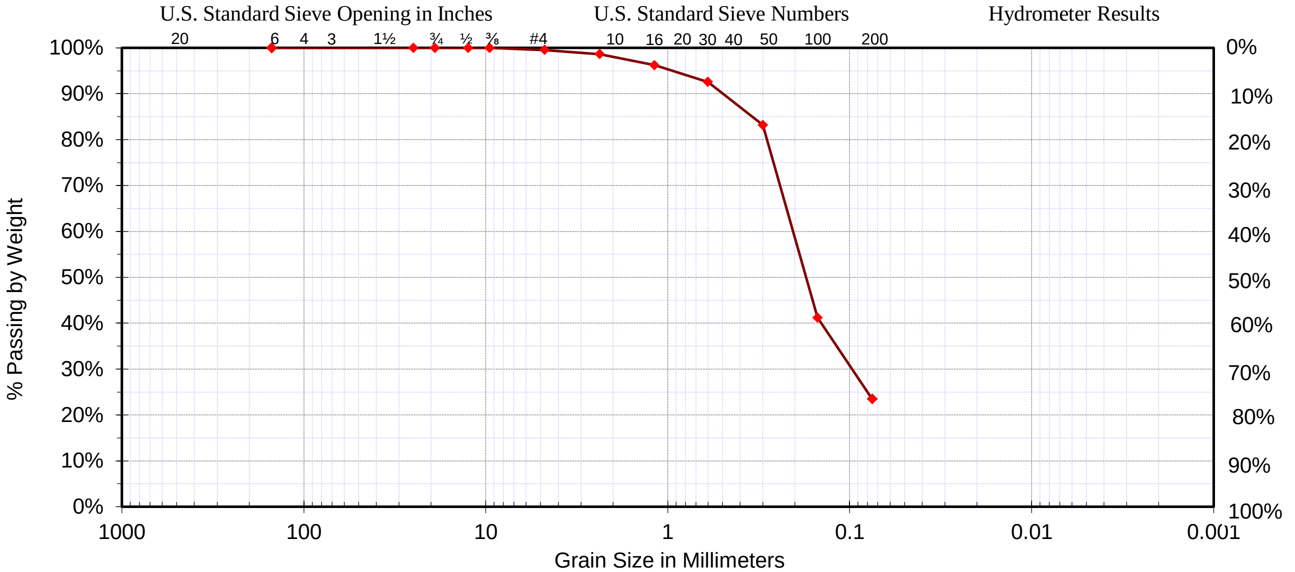


Date : 06/11/16	D_{10} = 0.07	**Classification**	% Gravel
Sample #:	D_{30} = 0.44	SW-SM, Well-graded Sand with Silt and Gravel	16.62%
Sample ID: B1 @ 5'	D_{60} = 1.82		% Sand
Source: SPT	C_C = 1.57	**Specifications**	72.38%
Project: Protea Senior Living	C_U = 26.74	custom specs 1	% Silt & Clay
Location: NWC of Cannon Road & Mystra Way, Oceanside, C	Liquid Limit= n/a		11.00%
Boring #: B1	Plastic Limit= n/a	Fineness Modulus	Sample Moisture
Depth: 5'	Plasticity Index= n/a	3.27	**3.2%**

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%		
4.00"	100.00		100.0%		
3.00"	75.00		100.0%		
2.50"	63.00		100.0%		
2.00"	50.00		100.0%		
1.75"	45.00		100.0%		
1.50"	37.50		100.0%		
1.25"	31.50		100.0%		
1.00"	25.00	100.0%	100.0%		
7/8"	22.40		100.0%		
3/4"	19.00	100.0%	100.0%		
5/8"	16.00		98.5%		
1/2"	12.50	96.8%	96.8%		
3/8"	9.50	94.2%	94.2%		
1/4"	6.30		86.9%		
#4	4.75	83.4%	83.4%		

Fines Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
#4	4.750	83.4%	83.4%		
#8	2.360	69.4%	69.4%		
#10	2.000		63.1%		
#16	1.180	48.8%	48.8%		
#20	0.850		41.1%		
#30	0.600	35.3%	35.3%		
#40	0.425		29.4%		
#50	0.300	25.3%	25.3%		
#60	0.250		22.5%		
#80	0.180		18.6%		
#100	0.150	16.9%	16.9%		
#140	0.106		13.4%		
#170	0.090		12.2%		
#200	0.075	11.0%	11.0%		
#270	0.053				

LABORATORY TEST RESULTS



Cobbles	Gravels		Sands			Silts	Clays
	Coarse	Fine	Coarse	Medium	Fine		

Date : 06/11/16
Sample #:
Sample ID: B3 @ 2'
Source: SPT
Project: Protea Senior Living
Location: NWC of Cannon Road & Mystra Way, Oceanside, C
Boring #: B3
Depth: 2'

D_{10} = 0.03
D_{30} = 0.10
D_{60} = 0.22
C_C = 1.52
C_U = 6.79
Liquid Limit= n/a
Plastic Limit= n/a
Plasticity Index= n/a

Classification
SC, Clayey Sand

Specifications
custom specs 1

Fineness Modulus
0.89

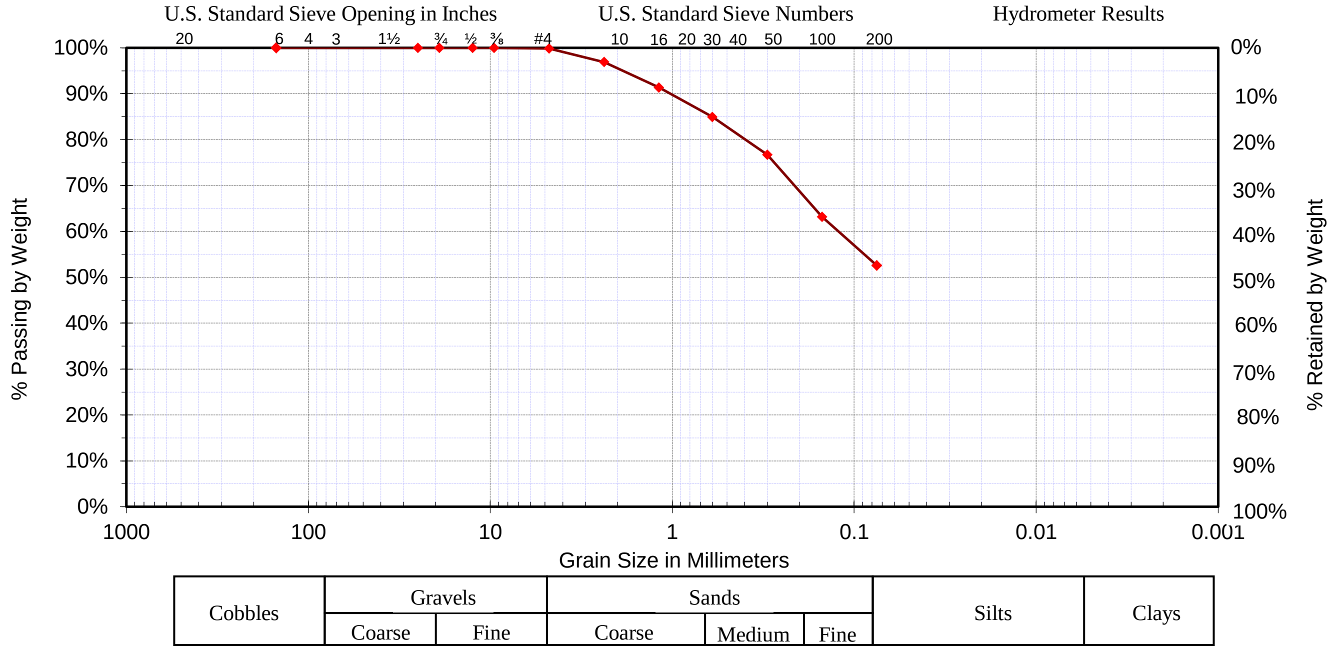
% Gravel
0.46%
% Sand
76.09%
% Silt & Clay
23.46%

Sample Moisture
8.5%

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%		
4.00"	100.00		100.0%		
3.00"	75.00		100.0%		
2.50"	63.00		100.0%		
2.00"	50.00		100.0%		
1.75"	45.00		100.0%		
1.50"	37.50		100.0%		
1.25"	31.50		100.0%		
1.00"	25.00	100.0%	100.0%		
7/8"	22.40		100.0%		
3/4"	19.00	100.0%	100.0%		
5/8"	16.00		100.0%		
1/2"	12.50	100.0%	100.0%		
3/8"	9.50	100.0%	100.0%		
1/4"	6.30		99.7%		
#4	4.75	99.5%	99.5%		

Fines Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
#4	4.750	99.5%	99.5%		
#8	2.360	98.6%	98.6%		
#10	2.000		97.9%		
#16	1.180	96.2%	96.2%		
#20	0.850		94.1%		
#30	0.600	92.6%	92.6%		
#40	0.425		87.1%		
#50	0.300	83.2%	83.2%		
#60	0.250		69.2%		
#80	0.180		49.6%		
#100	0.150	41.2%	41.2%		
#140	0.106		30.8%		
#170	0.090		27.0%		
#200	0.075	23.5%	23.5%		
#270	0.053				

LABORATORY TEST RESULTS



Date : 06/11/16
Sample #:
Sample ID: B4 @ 7'
Source: Bulk
Project: Protea Senior Living
Location: NWC of Cannon Road & Mystra Way, Oceanside, C
Boring #: B4
Depth: 7'

D_{10} = 0.01
D_{30} = 0.04
D_{60} = 0.13
C_C = 1.01
C_U = 8.94
Liquid Limit= n/a
Plastic Limit= n/a
Plasticity Index= n/a

Classification
#N/A

Specifications
custom specs 1

Fineness Modulus
0.87

% Gravel
0.16%
% Sand
47.28%
% Silt & Clay
52.55%

Sample Moisture
10.1%

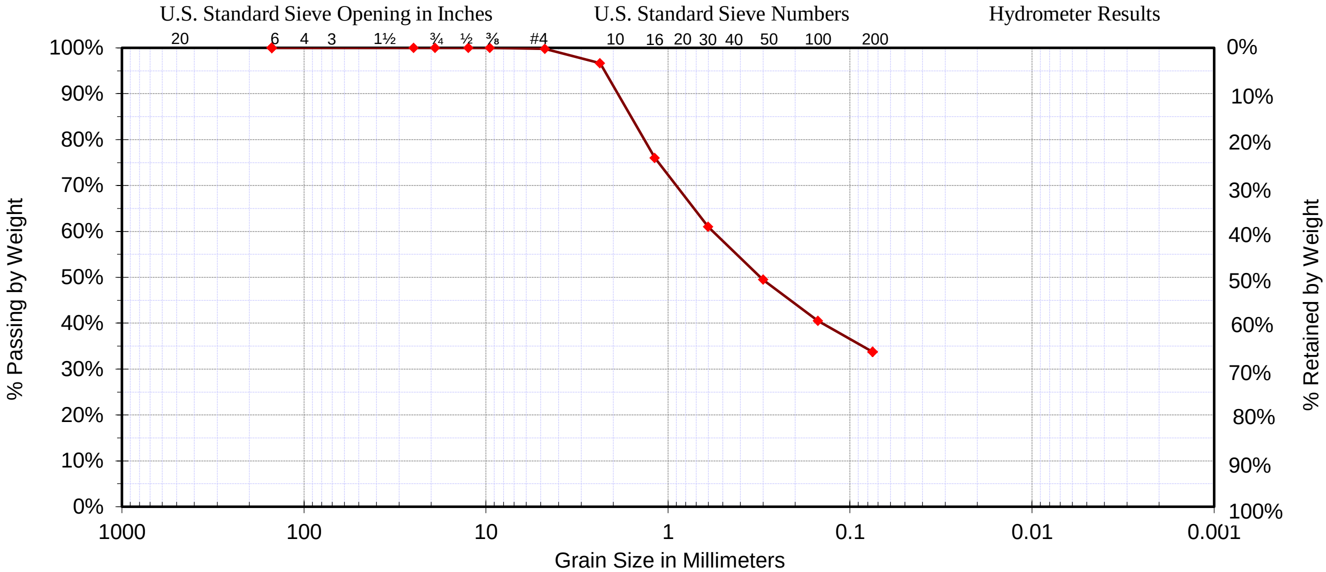
Coarse Section

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%		
4.00"	100.00		100.0%		
3.00"	75.00		100.0%		
2.50"	63.00		100.0%		
2.00"	50.00		100.0%		
1.75"	45.00		100.0%		
1.50"	37.50		100.0%		
1.25"	31.50		100.0%		
1.00"	25.00	100.0%	100.0%		
7/8"	22.40		100.0%		
3/4"	19.00	100.0%	100.0%		
5/8"	16.00		100.0%		
1/2"	12.50	100.0%	100.0%		
3/8"	9.50	100.0%	100.0%		
1/4"	6.30		99.9%		
#4	4.75	99.8%	99.8%		

Fines Section

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
#4	4.750	99.8%	99.8%		
#8	2.360	96.9%	96.9%		
#10	2.000		95.2%		
#16	1.180	91.4%	91.4%		
#20	0.850		87.7%		
#30	0.600	84.9%	84.9%		
#40	0.425		80.1%		
#50	0.300	76.7%	76.7%		
#60	0.250		72.2%		
#80	0.180		65.9%		
#100	0.150	63.2%	63.2%		
#140	0.106		56.9%		
#170	0.090		54.7%		
#200	0.075	52.6%	52.6%		
#270	0.053				

LABORATORY TEST RESULTS



Date : 06/11/16
Sample #:
Sample ID: B4 @ 10'
Source: Cal Ring
Project: Protea Senior Living
Location: NWC of Cannon Road & Mystra Way, Oceanside, C
Boring #: B4
Depth: 10'

D_{10} = 0.02
D_{30} = 0.07
D_{60} = 0.57
C_C = 0.35
C_U = 25.86
Liquid Limit= n/a
Plastic Limit= n/a
Plasticity Index= n/a

Classification
SC, Clayey Sand

Specifications
custom specs 1

Fineness Modulus
1.77

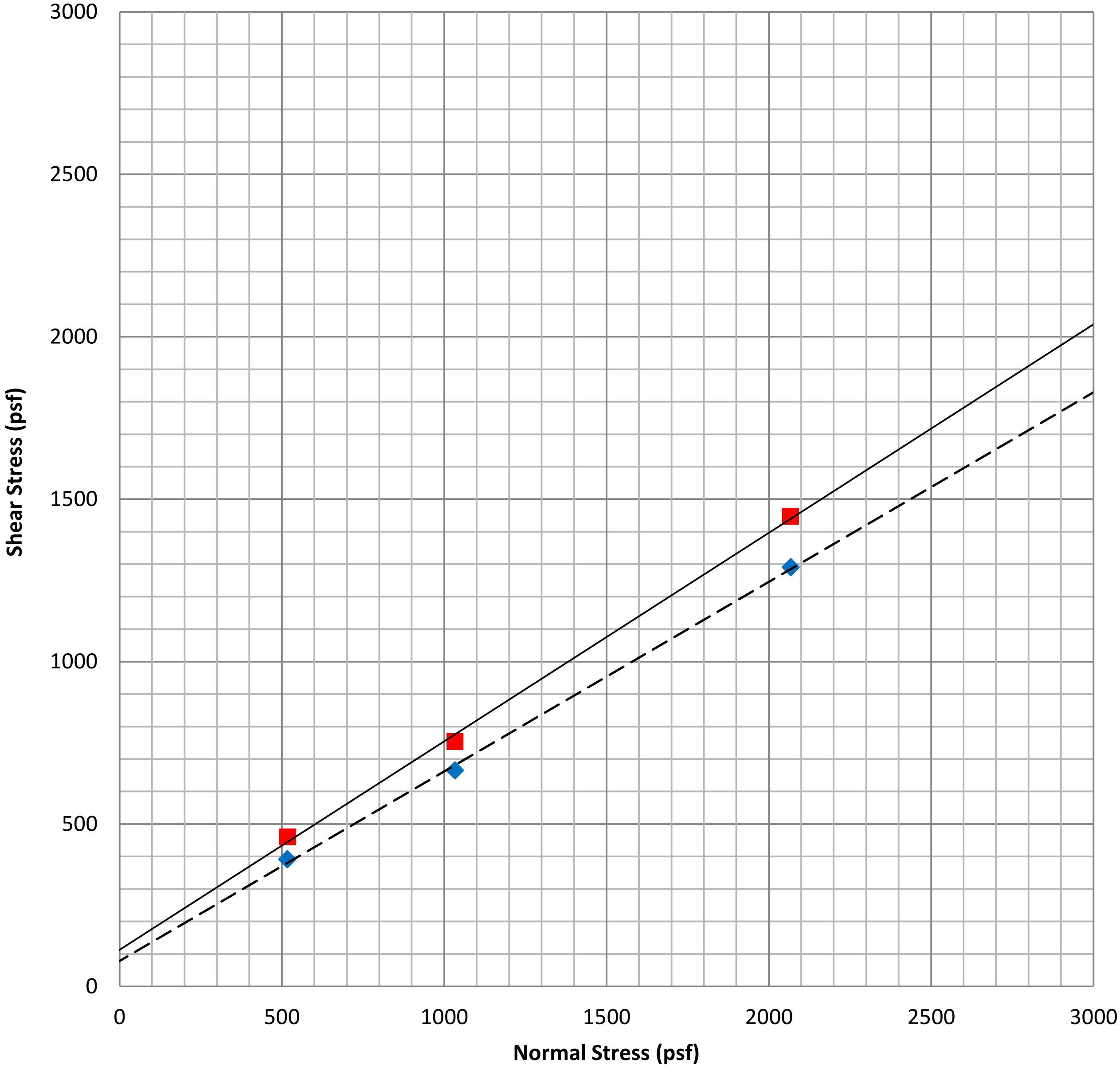
% Gravel
0.23%
% Sand
66.03%
% Silt & Clay
33.74%

Sample Moisture
10.4%

Coarse Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
6.00"	150.00		100.0%		
4.00"	100.00		100.0%		
3.00"	75.00		100.0%		
2.50"	63.00		100.0%		
2.00"	50.00		100.0%		
1.75"	45.00		100.0%		
1.50"	37.50		100.0%		
1.25"	31.50		100.0%		
1.00"	25.00	100.0%	100.0%		
7/8"	22.40		100.0%		
3/4"	19.00	100.0%	100.0%		
5/8"	16.00		100.0%		
1/2"	12.50	100.0%	100.0%		
3/8"	9.50	100.0%	100.0%		
1/4"	6.30		99.8%		
#4	4.75	99.8%	99.8%		

Fines Section Sieve Size US	Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
#4	4.750	99.8%	99.8%		
#8	2.360	96.6%	96.6%		
#10	2.000		90.3%		
#16	1.180	76.0%	76.0%		
#20	0.850		67.4%		
#30	0.600	61.0%	61.0%		
#40	0.425		54.3%		
#50	0.300	49.5%	49.5%		
#60	0.250		46.5%		
#80	0.180		42.3%		
#100	0.150	40.5%	40.5%		
#140	0.106		36.5%		
#170	0.090		35.1%		
#200	0.075	33.7%	33.7%		
#270	0.053				

DIRECT SHEAR TEST RESULTS

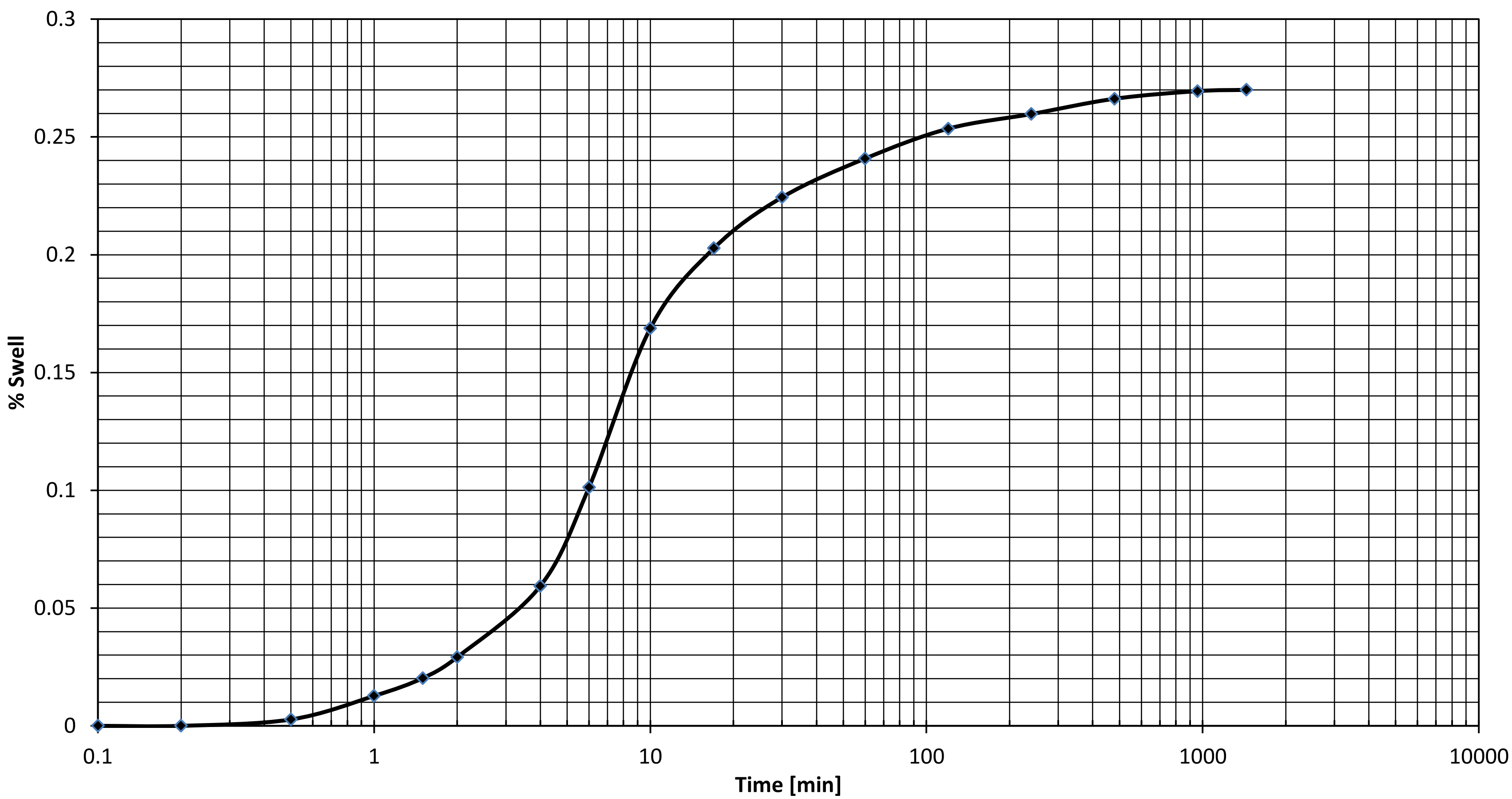


Sample	Symbol	Description	Soil Type [USCS]	Shear Strength	Friction Angle, ϕ [degrees]	Cohesion, c [psf]
B5 @ 3'		White Sandstone	SM	Peak	32.7	112
B5 @ 3'		White Sandstone	SM	Ultimate	30.3	78

Sample Moisture [%]	Saturated Moisture [%]	Dry Unit Weight [pcf]
12.9	24.5	103.6

ASTM D-3080

geomat



Classification of Potential Expansion of Soils Using Expansion Index, EI	Expansion Index, EI	0 to 20	21 to 50	51 to 90	91 to 130	>130
	Potential Expansion	Very Low	Low	Medium	High	Very High

Sample	Compacted Moisture	Compacted Dry Density	Final Moisture	Expansion Index	Expansion Classification
B4 Bulk	8.5%	110.9	17.5%	27	Low

Project Name:	Protea - Oceanside	Expansion Index: ASTM D 4829
Project No.:	16081-01	

GeoMat Testing Laboratories, Inc.

Soil Engineering, Environmental Engineering, Materials Testing, Geology

SOLUBLE SULFATE AND CHLORIDE TEST RESULTS

Project Name	Protea Senior Living	**Test Date**	6/13/2016
Project No.	16081-01	**Date Sampled**	6/11/2016
Project Location	NWC Cannon Rd & Mystra Way, Oceanside, CA	**Sampled By**	AM
Location in Structure	B4 Bulk	**Sample Type**	Bulk
Sampled Classification	SC	**Tested By**	AM

TESTING INFORMATION

Sample weight before drying	--
Sample weight after drying	--
Sample Weight Passing No. 10 Sieve	100 grams
Moisture	--

Location	Mixing Ratio	Dilution Factor	Sulfate Reading (ppm)	Sulfate Content (ppm)	Sulfate Content (%)
B4	3	2	75	450	0.045
			Average		

Chloride Reading (ppm)	Chloride Content (ppm)	Chloride Content (%)
Average		

pH	
Average	

ACI 318-05 Table 4.3.1 Requirements for Concrete Exposed to Sulfate-Containing Solutions

Sulfate Exposure	Water-Soluble Sulfate (SO_4) In Soil, % by Mass	Sulfate (SO_4) In Water ppm	Cement Type	Maximum w/cm by Mass	Minimum Design Compressive Strength fc, MPa (psi)
Negligible	< 0.10	< 150	No Special Type	--	--
Moderate (see water)	0.10 to 0.20	150 to 1500	II IP(MS), IS(MS), P(MS), I(PM)(MS), I(SM)(MS)	0.50	28 (4000)
Severe	0.20 to 2.00	1500 to 10,000	V	0.45	31 (4500)
Very Severe	> 2.00	>10,000	V + pozz	0.45	31 (4500)

Caltrans classifies a site as corrosive to structural concrete as an area where soil and/or water contains >500pp chloride, >2000ppm sulfate, or has a pH <5.5. A minimum resistivity of less than 1000 ohm-cm indicates the potential for corrosive environment requiring testing for the above criteria.

The 2007 CBC Section 1904A references ACI 318 for material selection and mix design for reinforced concrete dependant on the onsite corrosion potential, soluble chloride content, and soluble sulfate content in soil

Comments: Sec 4.3 of ACI 318 (2005) Soil environment is detrimental to concrete if it has soluble sulfate >1000ppm and/or pH<5.5. Soil environment is corrosive to reinforcement and steel pipes if Chloride ion >500ppm or pH <4.0.

The information in this form is not intended for corrosion engineering design. If corrosion is critical, a corrosion specialist should be contacted to provide further recommendations.

Signature Date

Print Name Title

Appendix D

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.1656°N, 117.2688°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1] $S_S = 1.048$ g

From Figure 22-2 [2] $S_1 = 0.407$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_S$	$\bar{N}$ **or** $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index *PI* > 20, • Moisture content *w* ≥ 40%, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE $_R$ Spectral Response Acceleration Parameter at Short Period				
	$S_S \le 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \ge 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 1.048 g, F_a = 1.081

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE $_R$ Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \le 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \ge 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.407 g, F_v = 1.593

Equation (11.4–1): $S_{MS} = F_a S_S = 1.081 \times 1.048 = 1.133$ g

---

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.593 \times 0.407 = 0.649$ g

---

Section 11.4.4 — Design Spectral Acceleration Parameters

Equation (11.4–3): $S_{DS} = ⅔ S_{MS} = ⅔ \times 1.133 = 0.755$ g

---

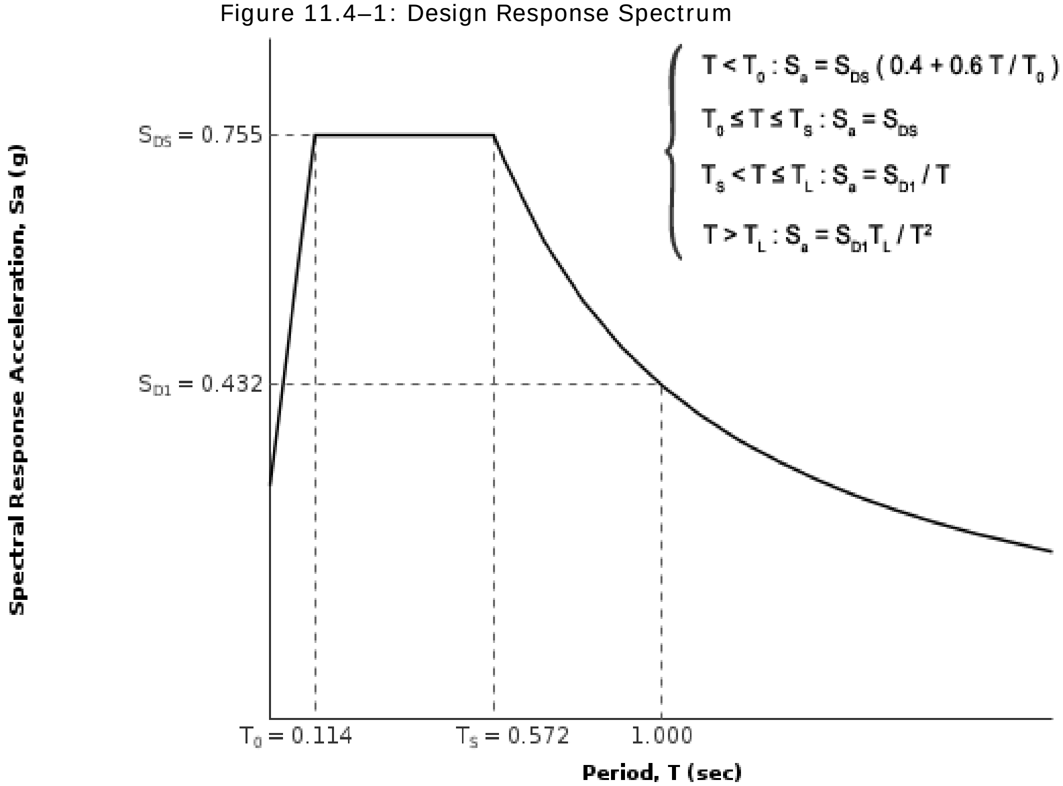
Equation (11.4–4): $S_{D1} = ⅔ S_{M1} = ⅔ \times 0.649 = 0.432$ g

---

Section 11.4.5 — Design Response Spectrum

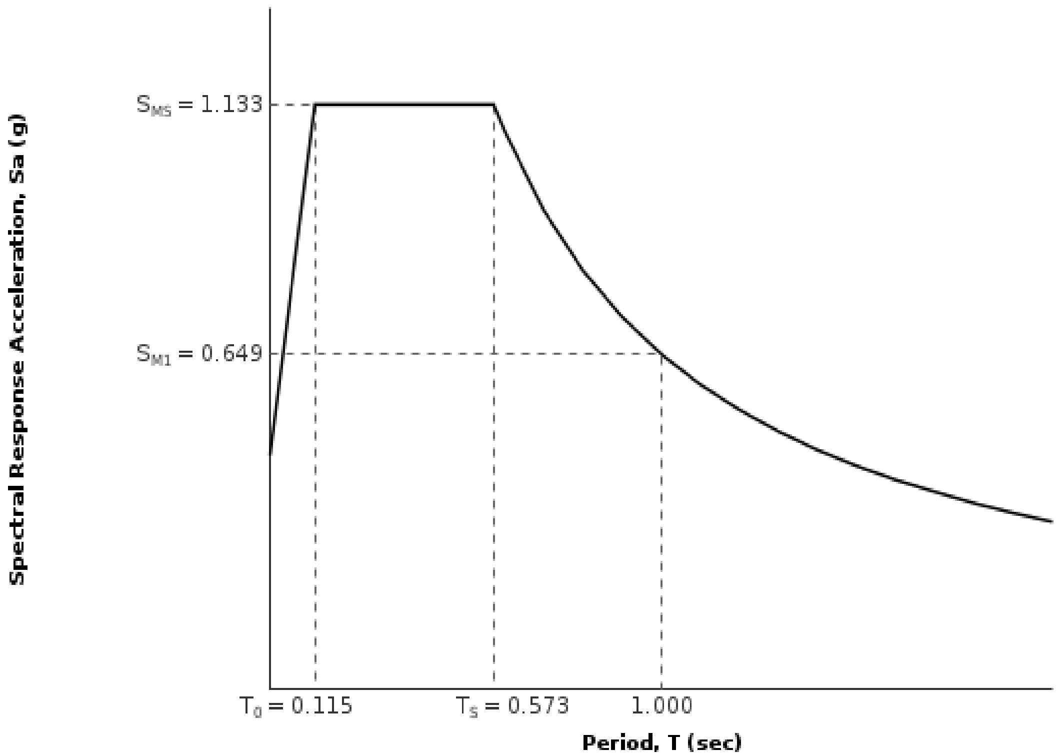
From Figure 22-12 [3] T_L = 8 seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.398

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.102 \times 0.398 = 0.438$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.398 g, F_{PGA} = 1.102

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.996

From Figure 22-18 [6] C_{R1} = 1.046

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	**III**	**IV**
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 0.755 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	**III**	**IV**
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.432 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

Appendix E

TABLE OF CONTENT

GENERAL

The guidelines contained herein and the standard details attached hereto represent this firm's standard recommendation for grading and other associated operations on construction projects. These guidelines should be considered a portion of the project specifications.
All plates attached hereto shall be considered as part of these guidelines.
The Contractor should not vary from these guidelines without prior recommendation by the Geotechnical Consultant and the approval of the Client or his authorized representative. Recommendation by the Geotechnical Consultant and/or Client should not be considered to preclude requirements for the approval by the controlling agency prior to the execution of any changes.
These Standard Grading Guidelines and Standard Details may be modified and/or superseded by recommendations contained in the text of the preliminary Geotechnical Report and/or subsequent reports.
If disputes arise out of the interpretation of these grading guidelines or standard details, the Geotechnical Consultant shall provide the governing interpretation.

DEFINITION OF TERMS

ALLUVIUM
Unconsolidated soil deposits resulting from flow of water, including sediments deposited in river beds, canyons, flood plains, lakes, fans and estuaries.
AS-GRADED (AS-BUILT): The surface and subsurface conditions at completion of grading.
BACKCUT: A temporary construction slope at the rear of earth retaining structures such as buttresses, shear keys, stabilization fills or retaining walls.
BACKDRAIN: Generally a pipe and gravel or similar drainage system placed behind earth retaining structures such buttresses, stabilization fills, and retaining walls.
BEDROCK: Relatively undisturbed formational rock, more or less solid, either at the surface or beneath superficial deposits of soil.
BENCH: A relatively level step and near vertical rise excavated into sloping ground on which fill is to be placed.
BORROW (Import): Any fill material hauled to the project site from off-site areas.
BUTTRESS FILL::A fill mass, the configuration of which is designed by engineering calculations to retain slope conditions containing adverse geologic features. A buttress is generally specified by minimum key width and depth and by maximum backcut angle. A buttress normally contains a back-drainage system.
CIVIL ENGINEER: The Registered Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topographic conditions.
CLIENT: The Developer or his authorized representative who is chiefly in charge of the project. He shall have the responsibility of reviewing the findings and recommendations made by the Geotechnical Consultant and shall authorize the Contractor and/or other consultants to perform work and/or provide services.
COLLUVIUM: Generally loose deposits usually found near the base of slopes and brought there chiefly by gravity through slow continuous downhill creep (also see Slope Wash).
COMPACTION : Densification of man-placed fill by mechanical means.
CONTRACTOR – A person or company under contract or otherwise retained by the Client to perform demolition, grading and other site improvements.
DEBRIS: All products of clearing, grubbing, demolition, and contaminated soil materials unsuitable for reuse as compacted fill, and/or any other material so designated by the Geotechnical Consultant.
ENGINEERING GEOLOGIST: A Geologist holding a valid certificate of registration in the specialty of Engineering Geology.
ENGINEERED FILL: A fill of which the Geotechnical Consultant or his representative, during grading, has made sufficient tests to enable him to conclude that the fill has been placed in substantial compliance with the recommendations of the Geotechnical Consultant and the governing agency requirements.
EROSION: The wearing away of ground surface as a result of the movement of wind, water, and/or ice.
EXCAVATION: The mechanical removal of earth materials.
EXISTING GRADE: The ground surface configuration prior to grading.
FILL: Any deposits of soil, rock, soil-rock blends or other similar materials placed by man.
FINISH GRADE: The ground surface configuration at which time the surface elevations conform to the approved plan.

GEOFABRIC: Any engineering textile utilized in geotechnical applications including subgrade stabilization and filtering.
GEOLOGIST: A representative of the Geotechnical Consultant educated and trained in the field of geology.
GEOTECHNICAL CONSULTANT: The Geotechnical Engineering and Engineering Geology consulting firm retained to provide technical services for the project. For the purpose of these specifications, observations by the Geotechnical Consultant include observations by the Soil Engineer, Geotechnical Engineer, Engineering Geologist and those performed by persons employed by and responsible to the Geotechnical Consultants.
GEOTECHNICAL ENGINEER: A licensed Geotechnical Engineer or Civil Engineer who applies scientific methods, engineering principles and professional experience to the acquisition, interpretation and use of knowledge of materials of the earth's crust for the evaluation of engineering problems. Geotechnical Engineering encompasses many of the engineering aspects of soil mechanics, rock mechanics, geology, geophysics, hydrology and related sciences.
GRADING: Any operation consisting of excavation, filling or combinations thereof and associated operations.
LANDSIDE DEBRIS: Material, generally porous and of low density, produced from instability of natural or man-made slopes.
MAXIMUM DENSITY: Standard laboratory test for maximum dry unit weight. Unless otherwise specified, the maximum dry unity weight shall be determined in accordance with ASTM Method of Test D 1557-91.
OPTIMUM MOISTURE – Soil moisture content at the test maximum density.
RELATIVE COMPACTION: The degree of compaction (expressed as a percentage) of dry unit weight of a material as compared to the maximum dry unit weight of the material.
ROUGH GRADE: The ground surface configuration at which time the surface elevations approximately conform to the approved plan.
SITE: The particular parcel of land where grading is being performed.
SHEAR KEY: Similar to buttress, however, it is generally constructed by excavating a slot within a natural slope, in order to stabilize the upper portion of the slope without grading encroaching into the lower portion of the slope.
SLOPE: An inclined ground surface, the steepness of which is generally specified as a ration of horizontal:vertical (e.g., 2:1)
SLOPE WASH: Soil and/or rock material that has been transported down a slope by action of gravity assisted by runoff water not confined by channels (also see Colluvium).
SOIL: Naturally occurring deposits of sand, silt, clay, etc., or combinations thereof.
SOIL ENGINEER: Licensed Geotechnical Engineer or Civil Engineer experienced in soil mechanics (also see Geotechnical Engineer).
STABILIZATION FILL: A fill mass, the configuration of which is typically related to slope height and specified by the standards of practice for enhancing the stability of locally adverse conditions. A stabilization fill is normally specified by minimum key width and depth and by maximum backcut angle. A stabilization fill may or may not have a backdrainage system specified.
SUBDRAIN: Generally a pipe and gravel or similar drainage system placed beneath a fill in the alignment of canyons or formed drainage channels.
SLOUGH: Loose, non-compacted fill material generated during grading operations.
TAILINGS: Non-engineered fill which accumulates on or adjacent to equipment haul-roads.
TERRACE: Relatively level step constructed in the face of a graded slope surface for drainage control and maintenance purposes.
TOPSOIL: The presumable fertile upper zone of soil, which is usually darker in color and loose.
WINDROW: A string of large rocks buried within engineered fill in accordance with guidelines set forth by the Geotechnical Consultant.

OBLIGATIONS OF PARTIES

The Geotechnical Consultant should provide observation and testing services and should make evaluations in order to advise the Client on Geotechnical matters. The Geotechnical Consultant should report his findings and recommendations to the Client or his authorized representative.
The client should be chiefly responsible for all aspects of the project. He or his authorized representative has the responsibility of reviewing the findings and recommendations of the Geotechnical Consultant. He shall authorize or cause to have authorized the Contractor and/or other consultants to perform work and/or provide services.

During grading the Client or his authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.
The Contractor should be responsible for the safety of the project and satisfactory completion of all grading and other associated operations on construction projects, including but not limited to, earthwork in accordance with the project plans, specifications and controlling agency requirements. During grading, the Contractor or his authorized representative should remain on-site. Overnight and on days off, the Contractor should remain accessible.

SITE PREPARATION

The Client, prior to any site preparation or grading, should arrange and attend a meeting among the Grading Contractor, the Design Engineer, the Geotechnical Consultant, representatives of the appropriate governing authorities as well as any other concerned parties. All parties should be given at least 48 hours notice.
Clearing and grubbing should consist of the removal of vegetation such as brush, grass, woods, stumps, trees, roots of trees and otherwise deleterious natural materials from the areas to be graded. Clearing and grubbing should extend to the outside of all proposed excavation and fill areas.
Demolition should include removal of buildings, structures, foundations, reservoirs, utilities (including underground pipelines, septic tanks, leach fields, seepage pits, cisterns, mining shafts, tunnels, etc.) and man-made surface and subsurface improvements from the areas to be graded. Demolition of utilities should include proper capping and/or re-routing pipelines at the project perimeter and cutoff and capping of wells in accordance with the requirements of the governing authorities and the recommendations of the Geotechnical Consultant at the time of the demolition.
Trees, plants or man-made improvements not planned to be removed or demolished should be protected by the Contractor from damage or injury.
Debris generated during clearing, grubbing and/or demolition operations should be wasted from areas to be graded and disposed off-site. Clearing, grubbing and demolition operations should be performed under the observation of the Geotechnical Consultant.
The Client or Contractor should obtain the required approvals for the controlling authorities for the project prior, during and/or after demolition, site preparation and removals, etc. The appropriate approvals should be obtained prior to proceeding with grading operations.

SITE PROTECTION

Protection of the site during the period of grading should be the responsibility of the Contractor. Unless other provisions are made in writing and agreed upon among the concerned parties, completion of a portion of the project should not be considered to preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete as identified by the Geotechnical Consultant, the Client and the regulating agencies.
The Contractor should be responsible for the stability of all temporary excavations. Recommendations by the Geotechnical Consultant pertaining to temporary excavations (e.g., backcuts) are made in consideration of stability of the completed project and therefore, should not be considered to preclude the responsibilities of the Contractor. Recommendations by the Geotechnical Consultant should not be considered to preclude more restrictive requirements by the regulating agencies.
Precautions should be taken during the performance of site clearing, excavations and grading to protect the work site from flooding, ponding, or inundation by poor or improper surface drainage. Temporary provisions should be made during the rainy season to adequately direct surface drainage away from and off the work site. Where low areas can not be avoided, pumps should be kept on hand to continually remove water during periods of rainfall.
During periods of rainfall, plastic sheeting should be kept reasonably accessible to prevent unprotected slopes from becoming saturated. Where necessary during periods of rainfall, the Contractor should install check-dams de-silting basins, rip-rap, sandbags or other devices or methods necessary to control erosion and provide safe conditions.
During periods of rainfall, the Geotechnical Consultant should be kept informed by the Contractor as to the nature of remedial or preventative work being performed (e.g., pumping, placement of sandbags or plastic sheeting, other labor, dozing, etc.).

Following periods of rainfall, the Contractor should contact the Geotechnical Consultant and arrange a walk-over of the site in order to visually assess rain related damage. The Geotechnical Consultant may also recommend excavations and testing in order to aid in his assessments. At the request of the Geotechnical Consultant, the Contractor shall make excavations in order to evaluate the extent of rain related damage.
Rain-related damage should be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress and other adverse conditions identified by the Geotechnical Consultant. Soil adversely affected should be classified as Unsuitable Materials and should be subject to overexcavation and replaced with compacted fill or other remedial grading as recommended by the Geotechnical Consultant.
Relatively level areas, where saturated soils and/or erosion gullies exist to depths greater then 1 foot, should be overexcavated to unaffected, competent material. Where less than 1 foot in depth, unsuitable materials may be processed in-place to achieve near optimum moisture conditions, then thoroughly recompacted in accordance with the applicable specifications. If the desired results are not achieved, the affected materials should be overexcavated then replaced in accordance with the applicable specifications.
In slope areas, where saturated soil and/or erosion gullies exist to depths of greater than 1 foot, should be over-excavated to unaffected, competent material. Where affected materials exist to depths of 1 foot or less below proposed finished grade, remedial grading by moisture conditioning in-place, followed by thorough recompaction in accordance with the applicable grading guidelines herein may be attempted. If the desired results are not achieved, all affected materials should be overexcavated and replaced as compacted fill in accordance with the slope repair recommendations herein. As field conditions dictate, other slope repair procedures may be recommended by the Geotechnical Consultant.

EXCAVATIONS

UNSUITABLE MATERIALS:
Materials which are unsuitable should be excavated under observation and recommendations of the Geotechnical Consultant. Unsuitable materials include, but may not be limited to dry, loose, soft, wet, organic compressible natural soils and fractured, weathered, soft, bedrock and nonengineered or otherwise deleterious fill materials.
Materials identified by the Geotechnical Consultant as unsatisfactory due to its moisture conditions should be overexcavated, watered or dried, as needed, and thoroughly blended to uniform near optimum moisture condition (per Moisture guidelines presented herein) prior to placement as compacted fill.

CUT SLOPES:
Unless otherwise recommended by the Geotechnical Consultant and approved by the regulating agencies, permanent cut slopes should not be steeper than 2:1 (horizontal:vertical).
If excavations for cut slopes expose loose, cohesionless, significantly fractured or otherwise suitable material, overexcavation and replacement of the unsuitable materials with a compacted stabilization fill should be accomplished as recommended by the Geotechnical Consultant. Unless otherwise specified by the Geotechnical Consultant, stabilization fill construction should conform to the requirements of the Standard Details.
The Geotechnical Consultant should review cut slopes during excavation. The Geotechnical Consultant should be notified by the contractor prior to beginning slope excavations.
If during the course of grading, adverse or potentially adverse geotechnical conditions are encountered which were not anticipated in the preliminary report, the Geotechnical Consultant should explore, analyze and make recommendations to treat these problems.
When cuts slopes are made in the direction of the prevailing drainage, a non-erodible diversion swale (brow ditch) should be provided at the top-of-cut.

PAD AREAS:
All lot pad areas, including side yard terraces, above stabilization fills or buttresses should be over-excavated to provide for a minimum of 3-feet (refer to Standard Details) of compacted fill over the entire pad area. Pad areas with both fill and cut materials exposed and pad areas containing both very shallow (less than 3-feet) and deeper fill should be over- thickness (refer to Standard Details).
Cut areas exposing significantly varying material types should also be overexcavated to provide for at least a 3-foot thick compacted fill blanket. Geotechnical conditions may require greater depth of overexcavation. The actual depth should be delineated by the Geotechnical Consultant during grading.

For pad areas created above cut or natural slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm and/or an appropriate pad gradient. A gradient in soil areas away from the top-of-slope of 2 percent or greater is recommended.

COMPACTED FILL

All fill materials should be compacted as specified below or by other methods specifically recommended by the Geotechnical Consultant. Unless otherwise specified, the minimum degree of compaction (relative compaction) should be 90 percent of the laboratory maximum density.

PLACEMENT

Prior to placement of compacted fill, the Contractor should request a review by the Geotechnical Consultant of the exposed ground surface. Unless otherwise recommended, the exposed ground surface should then be scarified (6-inches minimum), watered or dried as needed, thoroughly blended to achieve near optimum moisture conditions, then thoroughly compacted to a minimum of 90 percent of the maximum density. The review by the Geotechnical Consultants should not be considered to preclude requirements of inspection and approval by the governing agency.

Compacted fill should be placed in thin horizontal lifts not exceeding 8-inches in loose thickness prior to compaction. Each lift should be watered or dried as needed, thoroughly blended to achieve near optimum moisture conditions then thoroughly compacted by mechanical methods to a minimum of 90 percent of laboratory maximum dry density. Each lift should be treated in a like manner until the desired finished grades are achieved.

The Contractor should have suitable and sufficient mechanical compaction equipment and watering apparatus on the job site to handle the amount of fill being placed in consideration of moisture retention properties of the materials. If necessary, excavation equipment should be “shut down” temporarily in order to permit proper compaction of fills. Earth moving equipment should only be considered a supplement and not substituted for conventional compaction equipment.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal:vertical), horizontal keys and vertical benches should be excavated into the adjacent slope area. Keying and benching should be sufficient to provide at least 6-foot wide benches and minimum of 4-feet of vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill should be placed in an area subsequent to keying and benching until the area has been reviewed by the Geotechnical Consultant. Material generated by the benching operation should be moved sufficiently away from the bench area to allow for the recommended review of the horizontal bench prior to placement of fill. Typical keying and benching details have been included within the accompanying Standard Details.

Within a single fill area where grading procedures dictate two or more separate fills, temporary slopes (false slopes) may be created. When placing fill adjacent to a false slope, benching should be conducted in the same manner as above described. At least a 3-foot vertical bench should be established within the firm core of adjacent approved compacted fill prior to placement of additional fill. Benching should proceed in at least 3-foot vertical increments until the desired finished grades are achieved.

Fill should be tested for compliance with the recommended relative compaction and moisture conditions. Field density testing should conform to ASTM Method of Testing D 1556-64, D 2922-78 and/or D2937-71. Tests should be provided for about every 2 vertical feet or 1,000 cubic yards of fill placed. Actual test intervals may vary as field conditions dictate. Fill found not to be in conformance with the grading recommendations should be removed or otherwise handled as recommended by the Geotechnical Consultant.

The Contractor should assist the Geotechnical Consultant and/or his representative by digging test pits for removal determinations and/or for testing compacted fill.

As recommended by the Geotechnical Consultant, the Contractor should “shutdown” or remove any grading equipment from an area being tested.

The Geotechnical Consultant should maintain a plan with estimated locations of field tests. Unless the client provides for actual surveying of test locations, by the Geotechnical Consultant should only be considered rough estimates and should not be utilized for the purpose of preparing cross sections showing test locations or in any case for the purpose of after-the-fact evaluating of the sequence of fill placement.

MOISTURE

For field testing purposes, “near optimum” moisture will vary with material type and other factors including compaction procedures. “Near optimum” may be specifically recommended in Preliminary Investigation Reports and/or may be evaluated during grading.

Prior to placement of additional compacted fill following an overnight or other grading delay, the exposed surface of previously compacted fill should be processed by scarification, watered or dried as needed, thoroughly blended to near-optimum moisture conditions, then recompacted to a minimum of 90 percent of laboratory maximum dry density. Where wet or other dry or other unsuitable materials exist to depths of greater than one foot, the unsuitable materials should be overexcavated.

Following a period of flooding, rainfall or overwatering by other means, no additional fill should be placed until damage assessments have been made and remedial grading performed as described herein.

FILL MATERIAL

Excavated on-site materials which are acceptable to the Geotechnical Consultant may be utilized as compacted fill, provided trash, vegetation and other deleterious materials are removed prior to placement.

Where import materials are required for use on-site, the Geotechnical Consultant should be notified at least 72 hours in advance of importing, in order to sample and test materials from proposed borrow sites. No import materials should be delivered for use on-site without prior sampling and testing by Geotechnical Consultant.

Where oversized rock or similar irreducible material is generated during grading, it is recommended, where practical, to waste such material off-site or on-site in areas designated as “nonstructural rock disposal areas”. Rock placed in disposal areas should be placed with sufficient fines to fill voids. The rock should be compacted in lifts to an unyielding condition. The disposal area should be covered with at least 3-feet of compacted fill, which is free of oversized material. The upper 3-feet should be placed in accordance with the guidelines for compacted fill herein.

Rocks 3 inches in maximum dimension and smaller may be utilized within the compacted fill, provided they are placed in such a manner that nesting of the rock in avoided. Fill should be placed and thoroughly compacted over and around all rock. The amount of rock should not exceed 40 percent by dry weight passing the $^{3}/_{4}$-inch sieve size. The 3-inch and 40 percent recommendations herein may vary as field conditions dictate.

During the course of grading operations, rocks or similar irreducible materials greater than 3-inch maximum dimension (oversized material) may be generated. These rocks should not be placed within the compacted fill unless placed as recommended by the Geotechnical Consultant.

Where rocks or similar irreducible materials of greater that 3-inches but less than 4-feet of maximum dimension are generated during grading, or otherwise desired to be placed within an engineered fill, special handling in accordance with the accompanying Standard Details is recommended. Rocks greater than 4 feet should be broken down or disposed off-site. Rocks up to 4-feet maximum dimension should be placed below the upper 10-feet of any fill and should not be closer than 20-feet to any slope face. These recommendations could vary as locations of improvements dictate. Where practical, oversized material should not be placed below areas where structures of deep utilities are proposes.

Oversized material should be placed in windrows on a clean, overexcavated or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (S.E. 30 or higher) should be placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversized material should be staggered so that successive strata of oversized material are not in the same vertical plane.

It may be possible to dispose of individual larger rock as field conditions dictate and as recommended by the Geotechnical Consultant at time of placement.

Material that is considered unsuitable by the Geotechnical Consultant should not be utilized in the compacted fill.

During grading operations, placing and mixing the materials from the cut and/or borrow areas may result in soil mixtures which possess unique physical properties. Testing may be required of samples obtained directly from the fill areas in order to verify conformance with the specifications. Processing of these additional samples may take two or more working days. The Contractor may elect to move the operation to other areas within the project, or may continue placing compacted fill pending laboratory and field test results. Should he elect the second alternative, fill placed is done so at the Contractor’s risk.

Any fill placed in areas not previously reviewed and evaluated by the Geotechnical Consultant, and/or in other areas, without prior notification to the Geotechnical Consultant may require removal and recompaction at the Contractor's expense. Determination of overexcavations should be made upon review of field conditions by the Geotechnical Consultant.

FILL SLOPES

Unless otherwise recommended by the Geotechnical Consultant and approved by the regulating agencies, permanent fill slopes should not be steeper than 2:1 (horizontal to vertical).

Except as specifically recommended otherwise or as otherwise provided for in these grading guidelines (Reference Fill Materials), compacted fill slopes should be overbuilt and cut back to grade, exposing the firm, compacted fill inner core. The actual amount of overbuilding may vary as field conditions dictate. If the desired results are not achieved, the existing slopes should be overexcavated and reconstructed under the guidelines of the Geotechnical Consultant. The degree of overbuilding shall be increased until the desired compacted slope surface condition is achieved. Care should be taken by the Contractor to provide thorough mechanical compaction to the outer edge of the overbuilt slope surface.

Although no construction procedure produces a slope free from risk of future movement, overfilling and cutting back of slope to a compacted inner core is, given no other constraints, the most desirable procedure. Other constraints, however, must often be considered. These constraints may include property line situations, access, the critical nature of the development, and cost. Where such constraints are identified, slope face compaction may be attempted by conventional construction procedures including backrolling techniques upon specific recommendations by the Geotechnical Consultant.

As a second best alternative for slopes of 2:1 (horizontal to vertical) or flatter, slope construction may be attempted as outlined herein. Fill placement should proceed in thin lifts, (i.e., 6 to 8 inch loose thickness). Each lift should be moisture conditioned and thoroughly compacted. The desired moisture condition should be maintained and/or reestablished, where necessary, during the period between successive lifts. Selected lifts should be tested to ascertain that desired compaction is being achieved. Care should be taken to extend compactive effort to the outer edge of the slope. Each lift should extend horizontally to the desired finished slope surface or more as needed to ultimately establish desired grades. Grade during construction should not be allowed to roll off at the edge of the slope. It may be helpful to elevate slightly the outer edge of the slope. Slough resulting from the placement of individual lifts should not be allowed to drift down over previous lifts. At intervals not exceeding 4-feet in vertical slope height or the capability of available equipment, whichever is less, fill slopes should be thoroughly backrolled utilizing a conventional sheepsfoot-type roller. Care should be taken to maintain the desired moisture conditions and/or reestablishing same as needed prior to backrolling. Upon achieving final grade, the slopes should again be moisture conditioned and thoroughly backrolled. The use of a side-boom roller will probably be necessary and vibratory methods are strongly recommended. Without delay, so as to avoid (if possible) further moisture conditioning, the slopes should then be grid-rolled to achieve a relatively smooth surface and uniformly compact condition.

In order to monitor slope construction procedures, moisture and density tests will be taken at regular intervals. Failure to achieve the desired results will likely result in a recommendation by the Geotechnical Consultant to overexcavate the slope surfaces followed by reconstruction of the slopes utilizing overfilling and cutting back procedures and/or further attempt at the conventional backrolling approach. Other recommendations may also be provided which would be commensurate with field conditions.

Where placement of fill above a natural slope or above a cut slope is proposed, the fill slope configuration as presented in the accompanying standard Details should be adopted.

For pad areas above fill slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm and pad gradients of at least 2-percent in soil area.

OFF-SITE FILL

Off-site fill should be treated in the same manner as recommended in these specifications for site preparation, excavation, drains, compaction, etc.

Off-site canyon fill should be placed in preparation for future additional fill, as shown in the accompanying Standard Details.

Off-site fill subdrains temporarily terminated (up canyon) should be surveyed for future relocation and connection.

DRAINAGE

Canyon sub-drain systems specified by the Geotechnical Consultant should be installed in accordance with the Standard Details.
Typical sub-drains for compacted fill buttresses, slope stabilization or sidehill masses, should be installed in accordance with the specifications of the accompanying Standard Details.
Roof, pad and slope drainage should be directed away from slopes and areas of structures to suitable disposal areas via non-erodible devices (i.e., gutters, downspouts, concrete swales).
For drainage over soil areas immediately away from structures (i.e., within 4-feet), a minimum of 4 percent gradient should be maintained. Pad drainage of at least 2 percent should be maintained over soil areas. Pad drainage may be reduced to at least 1 percent for projects where no slopes exist, either natural or man-made, or greater than 10-feet in height and where no slopes are planned, either natural or man-made, steeper than 2:1 (horizontal to vertical slope ratio).
Drainage patterns established at the time of fine grading should be maintained throughout the life of the project. Property owners should be made aware that altering drainage patterns can be detrimental to slope stability and foundation performance.

STAKING

In all fill areas, the fill should be compacted prior to the placement of the stakes. This particularly is important on fill slopes. Slope stakes should not be placed until the slope is thoroughly compacted (backrolled). If stakes must be placed prior to the completion of compaction procedures, it must be recognized that they will be removed and/or demolished at such time as compaction procedures resume.
In order to allow for remedial grading operations, which could include overexcavations or slope stabilization, appropriate staking offsets should be provided. For finished slope and stabilization backcut areas, we recommend at least 10-feet setback from proposed toes and tops-of-cut.

SLOPE MAINTENANCE LANDSCAPE PLANTS

In order to enhance superficial slope stability, slope planting should be accomplished at the completion of grading. Slope planting should consist of deep-rooting vegetation requiring little watering. Plants native to the Southern California area and plants relative to native plants are generally desirable. Plants native to other semiarid and arid areas may also be appropriate. A Landscape Architect would be the best party to consult regarding actual types of plants and planting configuration.

IRRIGATION

Irrigation pipes should be anchored to slope faces, not placed in trenches excavated into slope faces.
Slope irrigation should be minimized. If automatic timing devices are utilized on irrigation systems, provisions should be made for interrupting normal irrigation during periods of rainfall.
Though not a requirement, consideration should be give to the installation of near-surface moisture monitoring control devices. Such devices can aid in the maintenance of relatively uniform and reasonably constant moisture conditions.
Property owners should be made aware that overwatering of slopes is detrimental to slope stability.

MAINTENANCE

Periodic inspections of landscaped slope areas should be planned and appropriate measures should be taken to control weeds and enhance growth of the landscape plants. Some areas may require occasional replanting and/or reseeding.
Terrace drains and downdrains should be periodically inspected and maintained free of debris. Damage to drainage improvements should be repaired immediately.
Property owners should be made aware that burrowing animals can be detrimental to slope stability. A preventative program should be established to control burrowing animals.
As a precautionary measure, plastic sheeting should be readily available, or kept on hand, to protect all slope areas from saturation by periods of heavy or prolonged rainfall. This measure is strongly recommended, beginning with the period of time prior to landscape planting.

REPAIRS

If slope failures occur, the Geotechnical Consultant should be contacted for a field review of site conditions and development of recommendations for evaluation and repair.

If slope failure occurs as a result of exposure to periods of heavy rainfall, the failure areas and currently unaffected areas should be covered with plastic sheeting to protect against additional saturation.

In the accompanying Standard Details, appropriate repair procedures are illustrated for superficial slope failures (i.e., occurring typically within the outer 1 foot to 3 feet of a slope face).

TRENCH BACKFILL

Utility trench backfill should, unless otherwise recommended, be compacted by mechanical means. Unless otherwise recommended, the degree of compaction should be a minimum of 95 percent of the laboratory maximum density.

Approved granular material (sand equivalent greater than 30) should be used to bed and backfill utilities to a depth of at least 1 foot over the pipe. This backfill should be uniformly watered, compacted and/or wheel-rolled from the surface to a firm condition for pipe support.

The remainder of the backfill shall be typical on-site soil or imported soil which should be placed in lifts not exceeding 8 inches in thickness, watered or aerated to at least 3 percent above the optimum moisture content, and mechanically compacted to at least 95 percent of maximum dry density (based on ASTM D1557).

Backfill of exterior and interior trenches extending below a 1:1 projection from the outer edge of foundations should be mechanically compacted to a minimum of 95 percent of the laboratory maximum density.

Within slab areas, but outside the influence of foundations, trenches up to 1 foot wide and 2 feet deep may be backfilled with sand and consolidated by uniformly watering or by mechanical means. If on-site materials are utilized, they should be wheel-rolled, tamped or otherwise compacted to a firm condition. For minor interior trenches, density testing may be deleted or spot testing may be elected if deemed necessary, based on review of back-fill operations during construction.

If utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, the Contractor may elect the utilization of light weight compaction equipment and/or shading of the conduit with clean, granular material, which should be thoroughly jetted in-place above the conduit, prior to initiating mechanical compaction procedures. Other methods of utility trench compaction may also be appropriate, upon review by the Geotechnical Consultant at the time of construction.

In cases where clean granular materials are proposed for use in lieu of native materials or where flooding or jetting is proposed, the procedures should be considered subject to review by the Geotechnical Consultant.

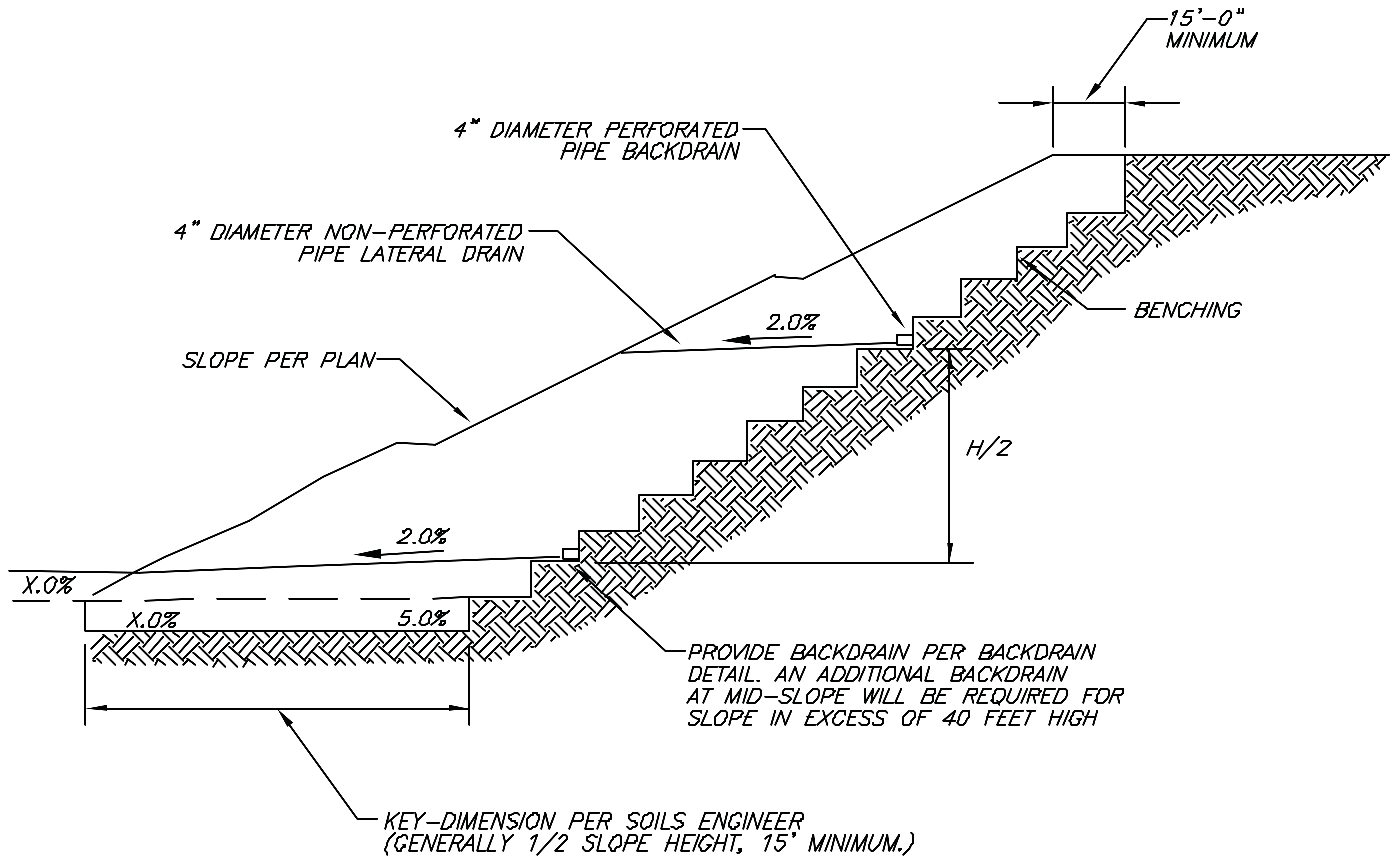
Clean Granular backfill and/or bedding are not recommended in slope areas unless provisions are made for a drainage system to mitigate the potential build-up of seepage forces.

STATUS OF GRADING

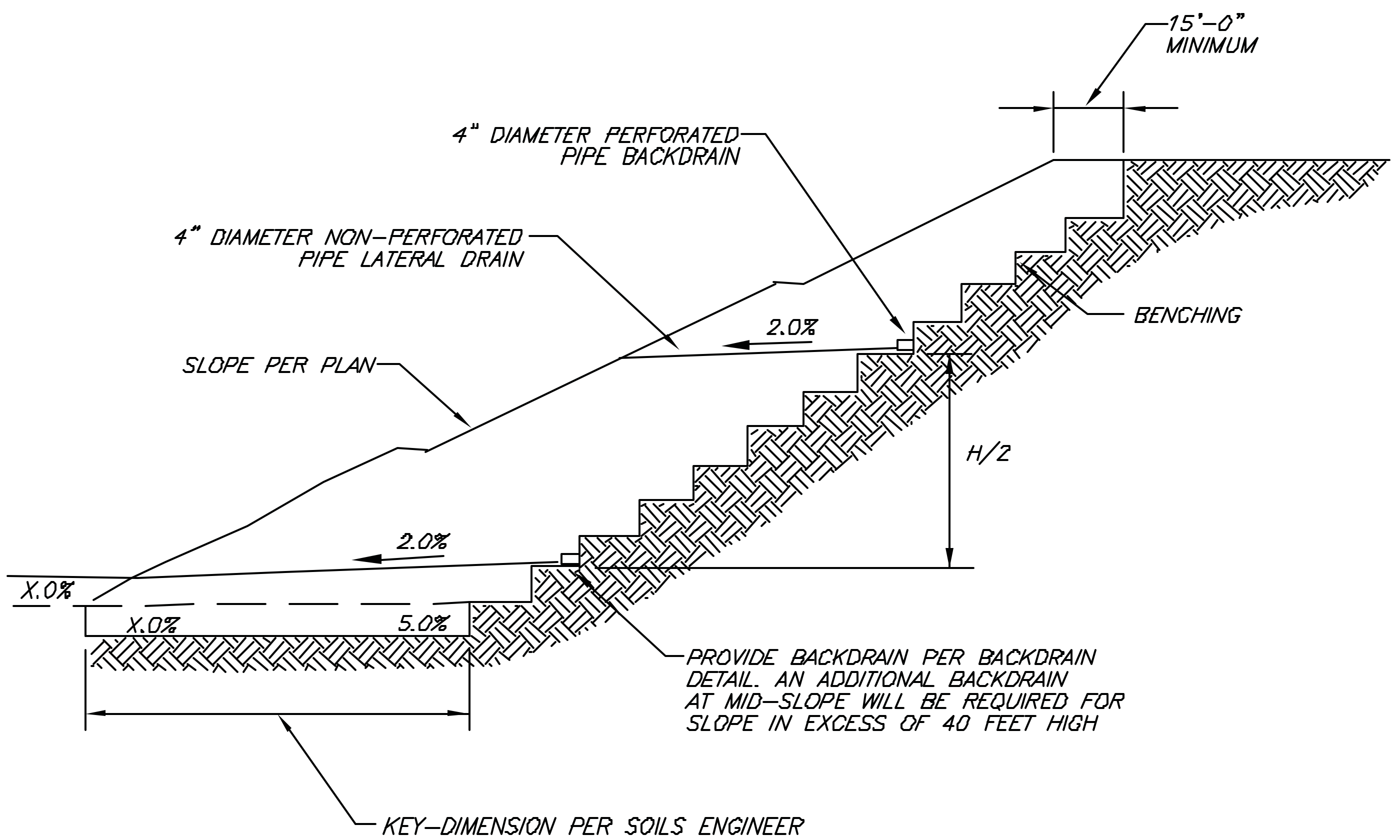
Prior to proceeding with any grading operation, the Geotechnical Consultant should be notified at least two working days in advance in order to schedule the necessary observation and testing services.

Prior to any significant expansion of cut back in the grading operation, the Geotechnical Consultant should be provided with adequate notice (i.e., two days) in order to make appropriate adjustments in observation and testing services.

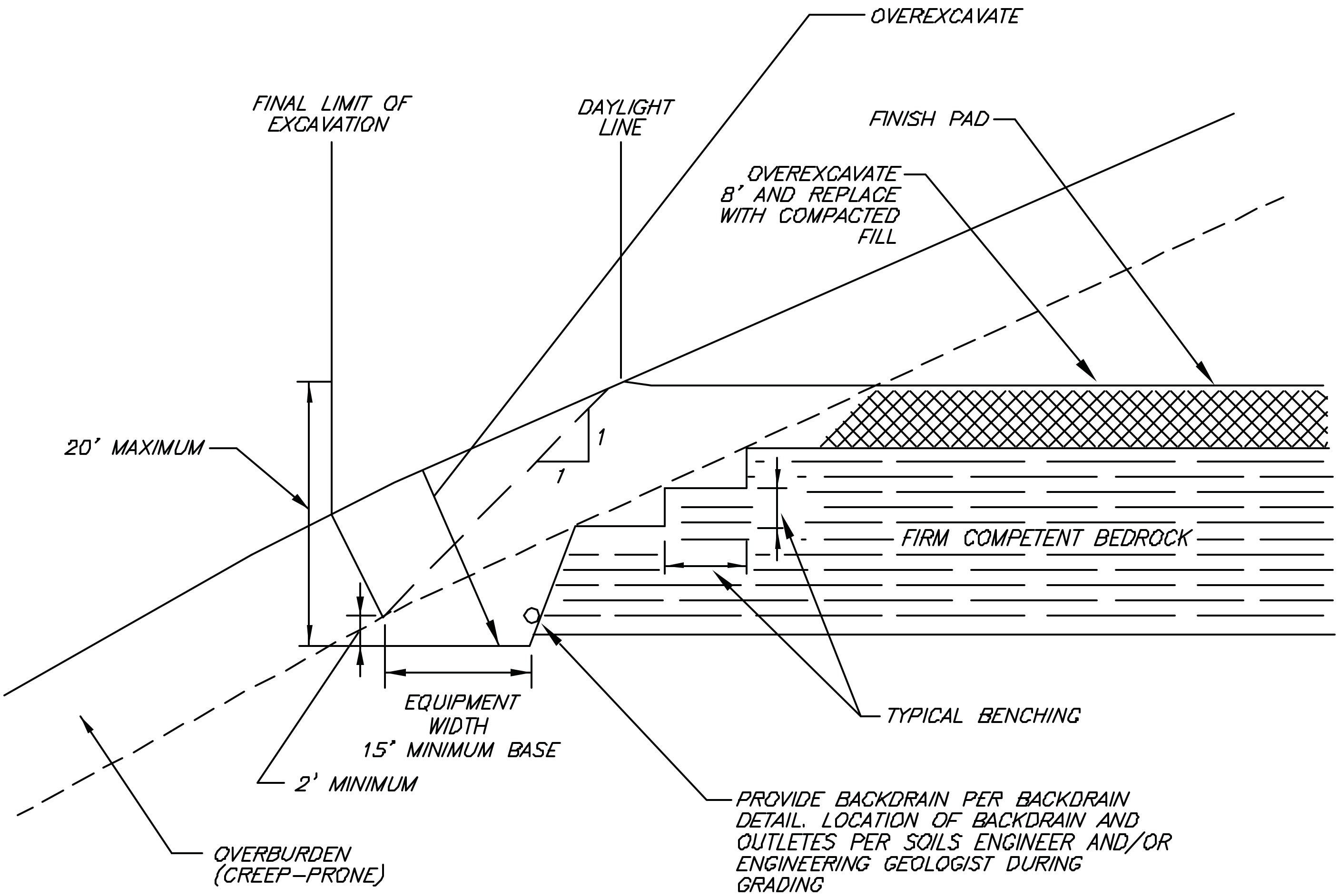
Following completion of grading operations and/or between phases of a grading operation, the Geotechnical Consultant should be provided with at least two working days notice in advance of commencement of additional grading operations.



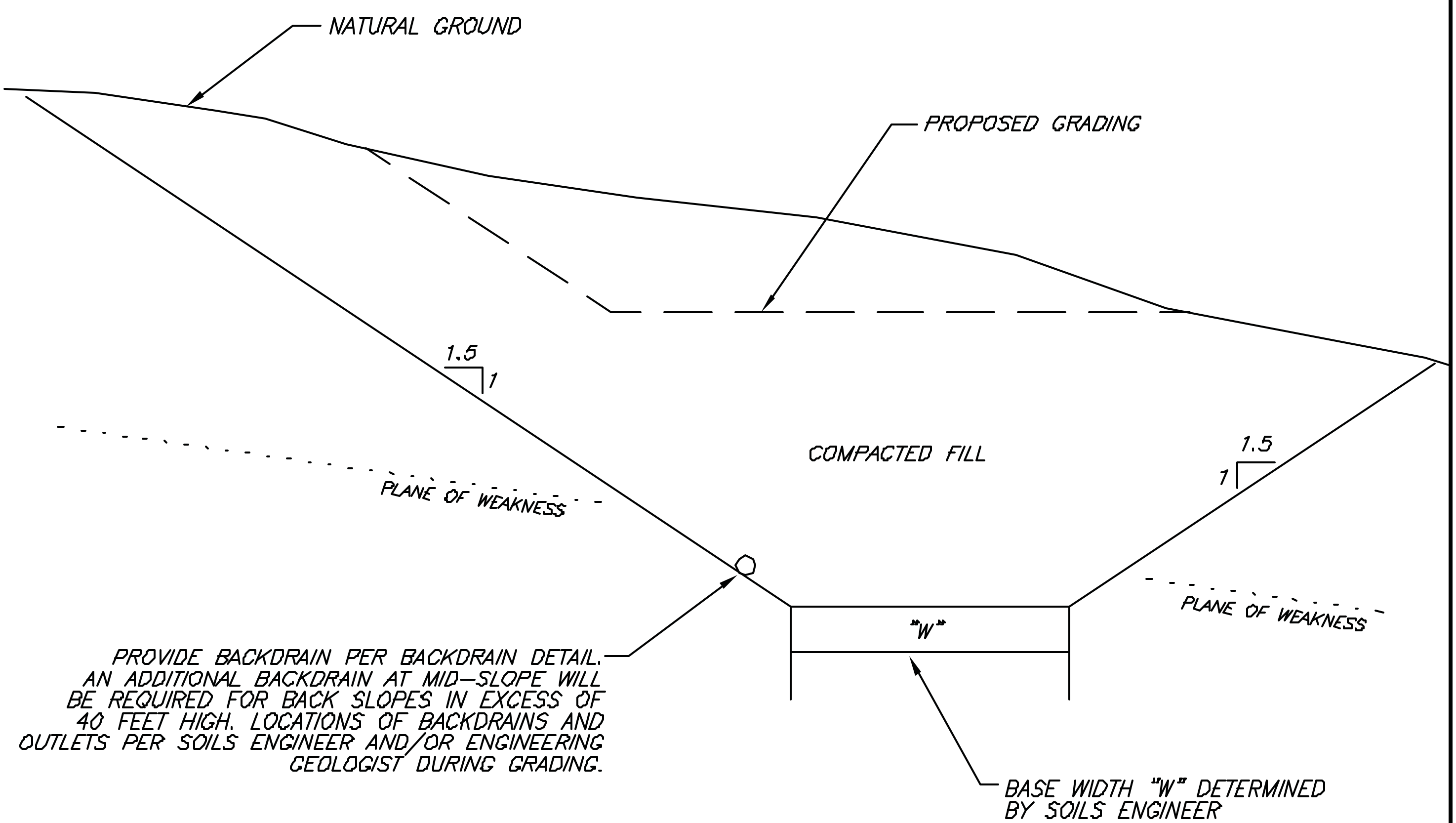
TYPICAL STABILIZATION FILL DETAIL



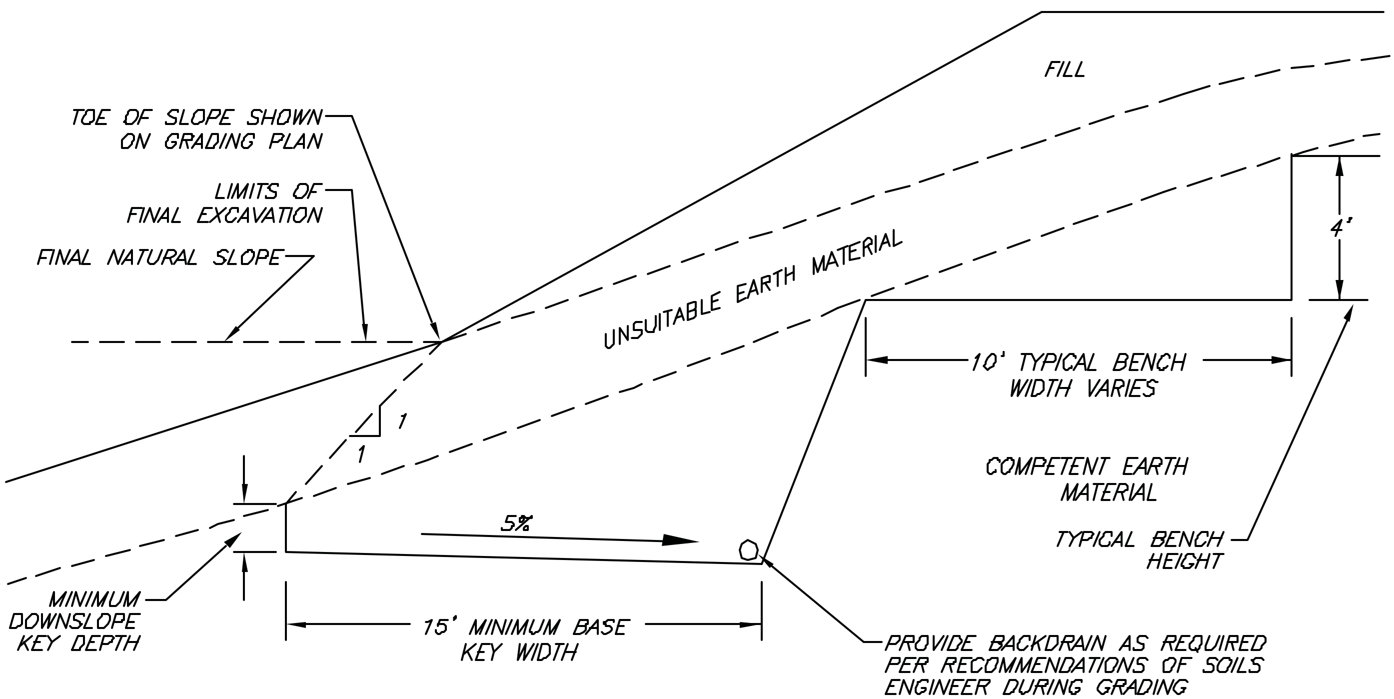
TYPICAL BUTTRESS FILL DETAIL



DAYLIGHT SHEAR KEY DETAIL

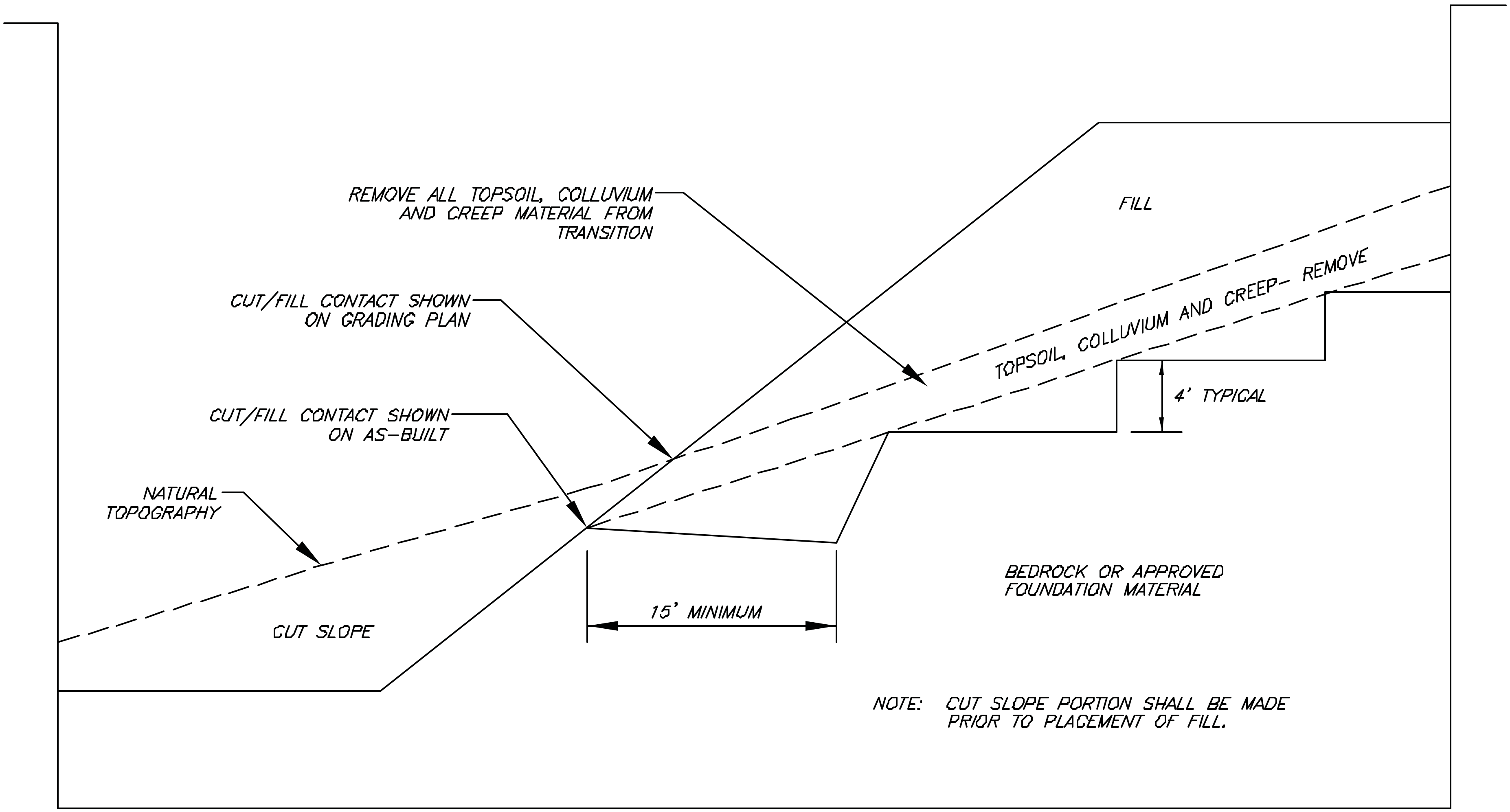


TYPICAL SHEAR KEY DETAIL

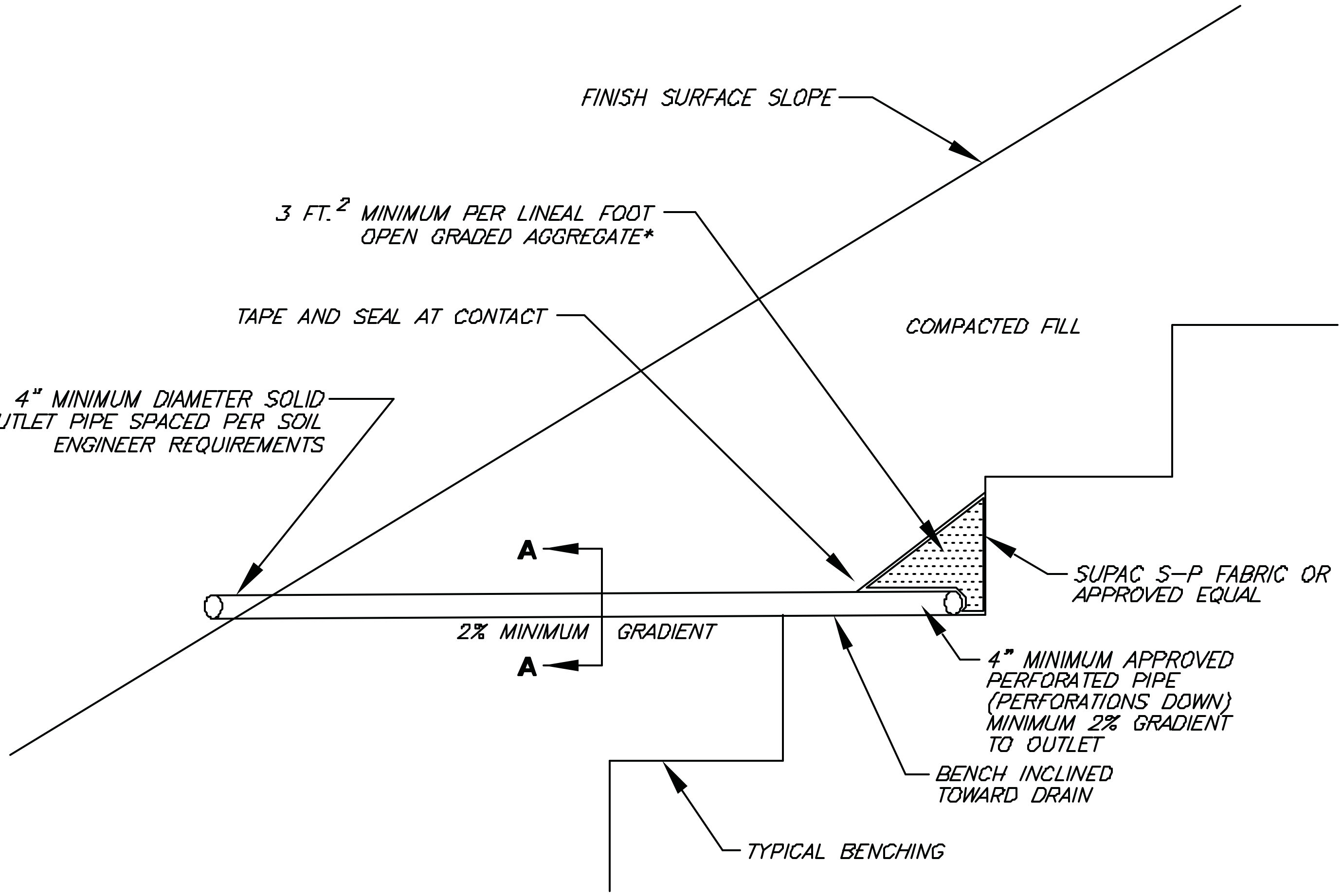


WHERE NATURAL SLOPE IS 5:1 OR LESS, BENCHING IS NOT NECESSARY, HOWEVER, FILL IS NOT TO BE PLACED ON COMPRESSIBLE OR UNSUITABLE MATERIAL.

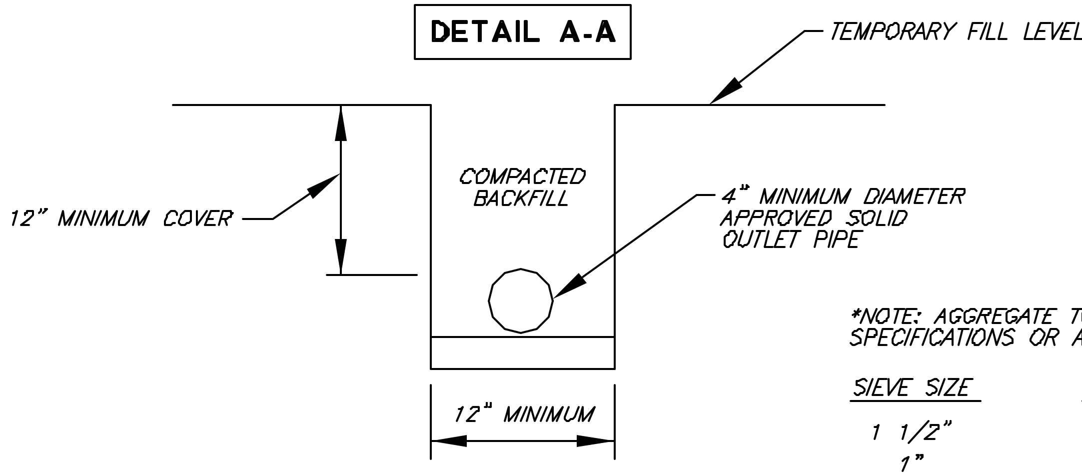
FILL SLOPE ABOVE NATURAL GROUND DETAIL



FILL SLOPE ABOVE CUT SLOPE DETAIL



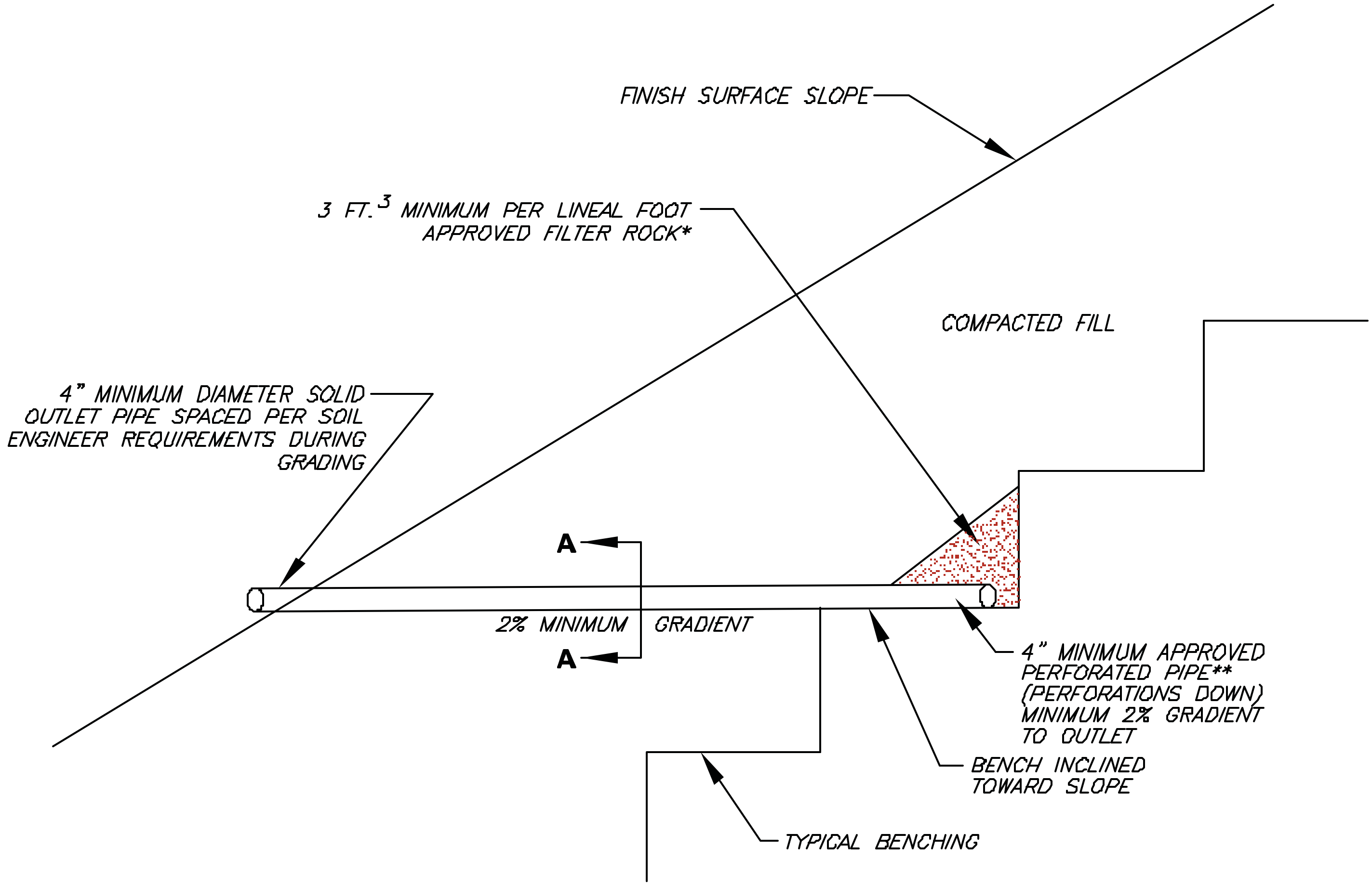
DETAIL A-A



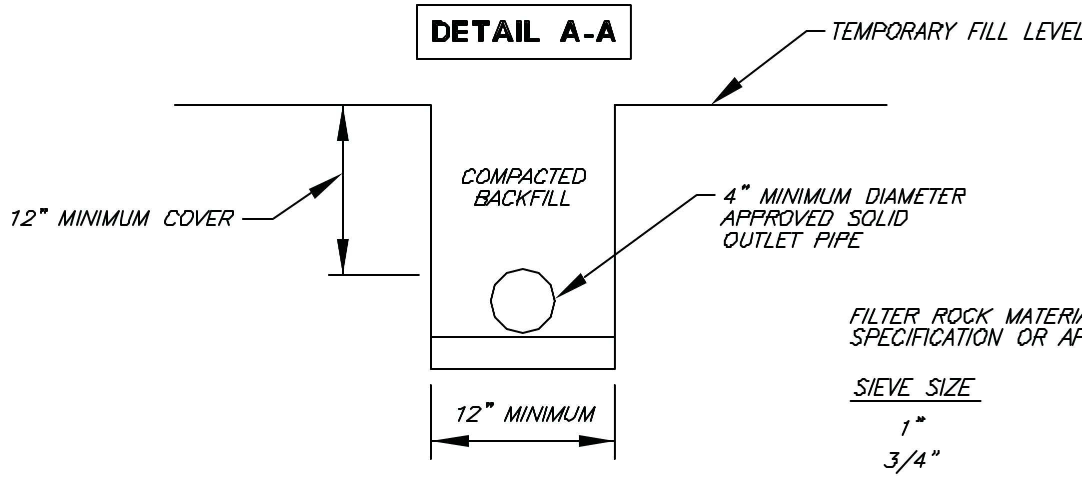
*NOTE: AGGREGATE TO MEET FOLLOWING SPECIFICATIONS OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 1/2"	100
1"	5-40
3/4"	0-17
3/8"	0-7
NO. 200	0-3

BACKDRAIN DETAIL (GEOFABRIC)



DETAIL A-A



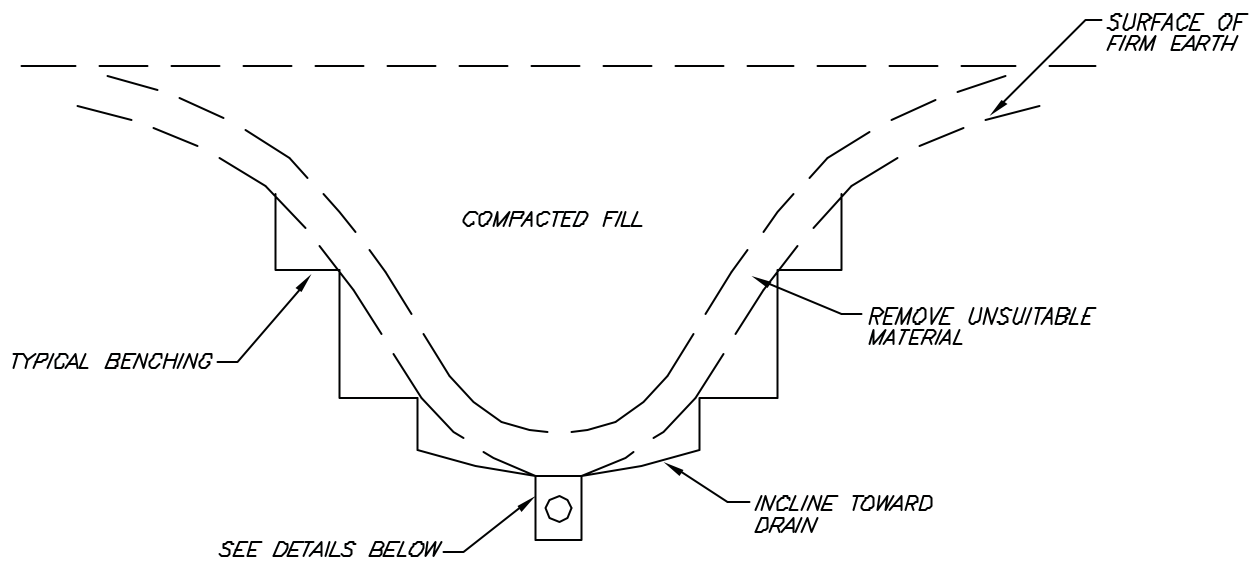
FILTER ROCK MATERIAL TO MEET FOLLOWING
SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE
1"	100
3/4"	90–100
3/8"	40–100
NO. 4	25–40
NO. 30	5–15
NO. 50	0–7
NO. 200	0–3

**APPROVED PIPE TYPE:

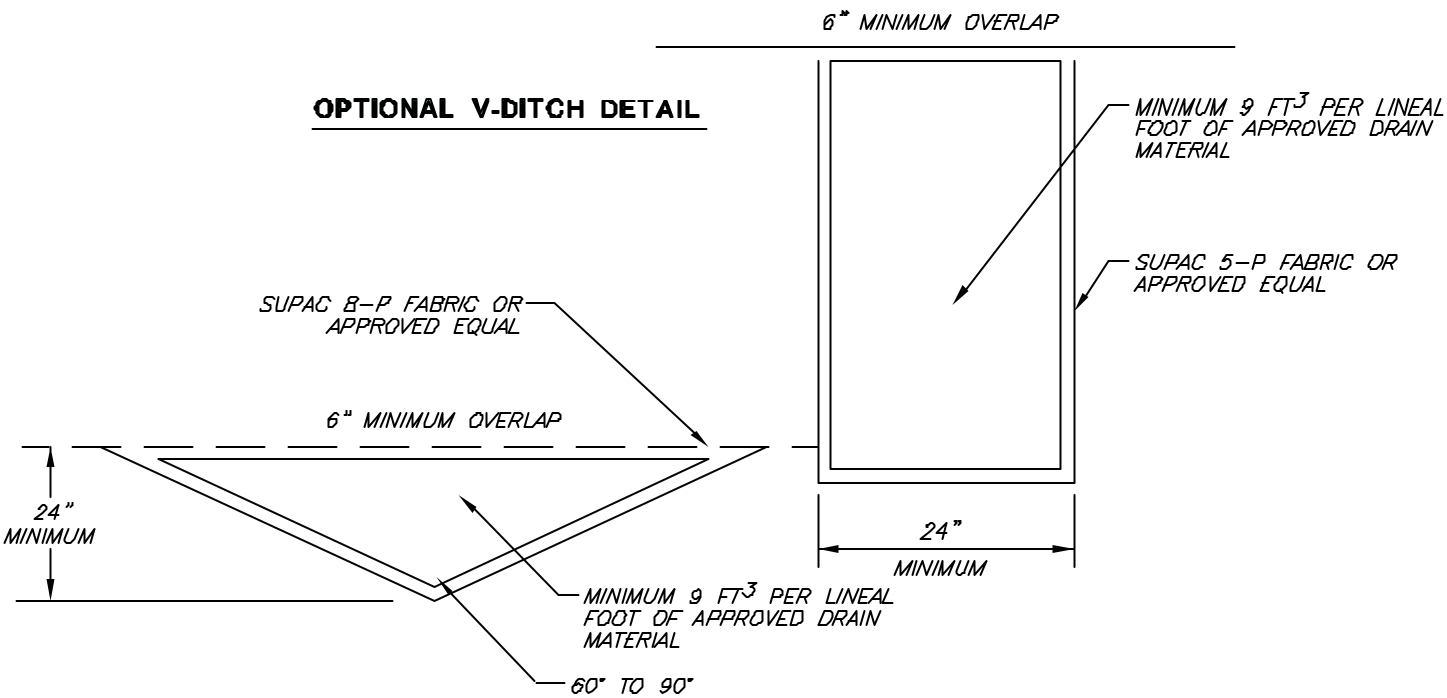
SCHEDULE 40 POLYVINYL CHLORIDE
(P.V.C.) OR APPROVED EQUAL.
MINIMUM CRUSH STRENGTH 1000 PSI.

TYPICAL BACKDRAIN DETAIL



TRENCH DETAIL

OPTIONAL V-DITCH DETAIL



DRAIN MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

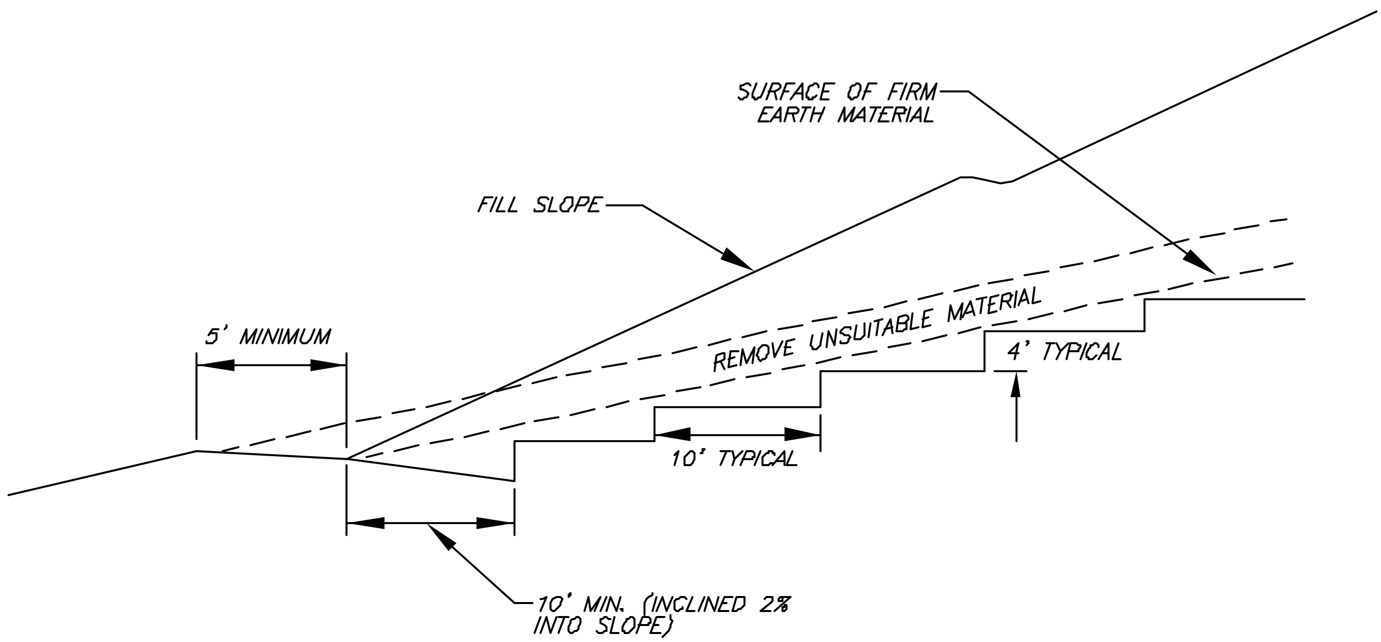
SIEVE SIZE	PERCENTAGE PASSING
1-1/2"	88-100
1"	5-40
3/4"	0-17
3/8"	0-7
NO.:200	0-3

ADD MINIMUM 4" DIAMETER APPROVED PERFORATED PIPE WHEN GRADIENT IS LESS THAN 2%

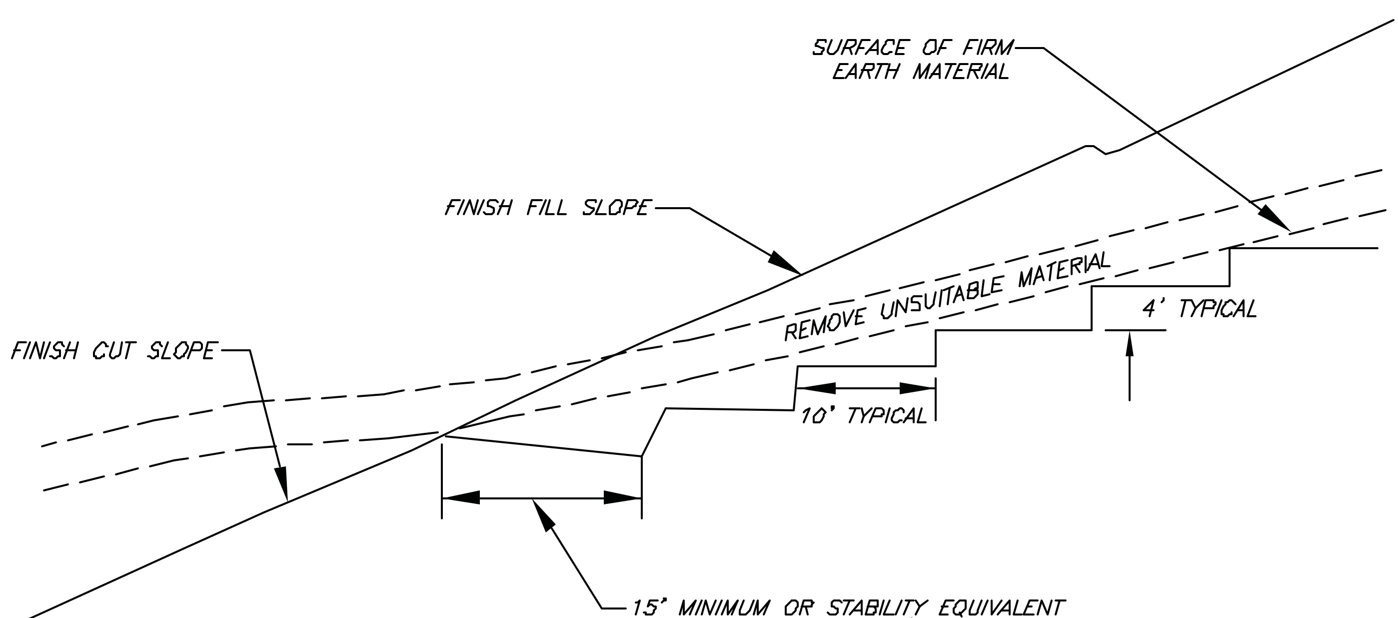
APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi.

GEOFABRIC SUBDRAIN DETAIL

BENCHING FILL OVER NATURAL

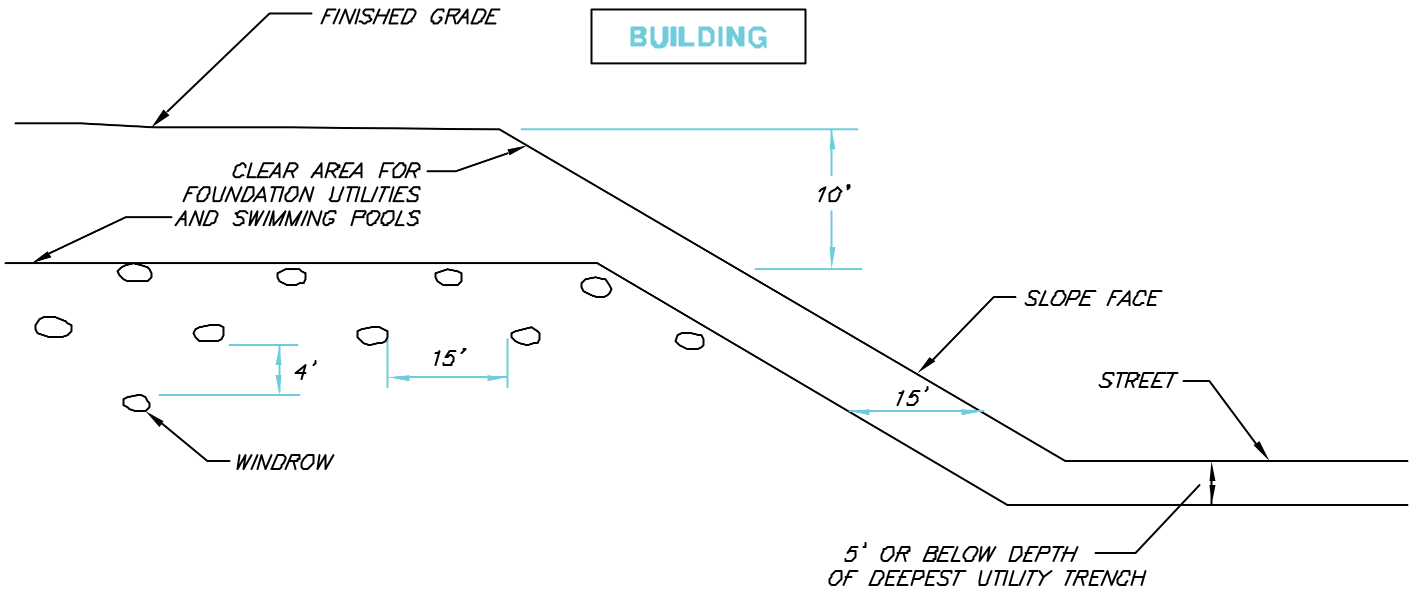


BENCHING FILL OVER CUT

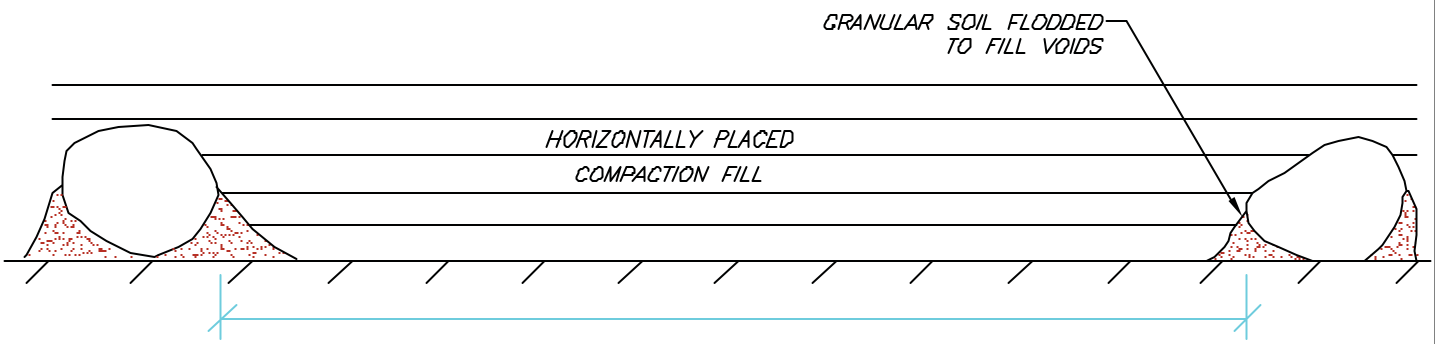


BENCHING FOR COMPACTED FILL DETAIL

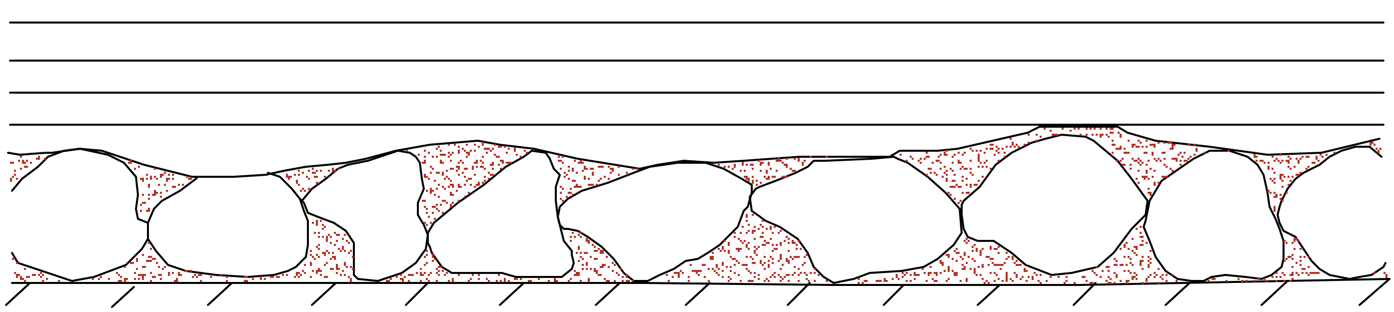
BUILDING



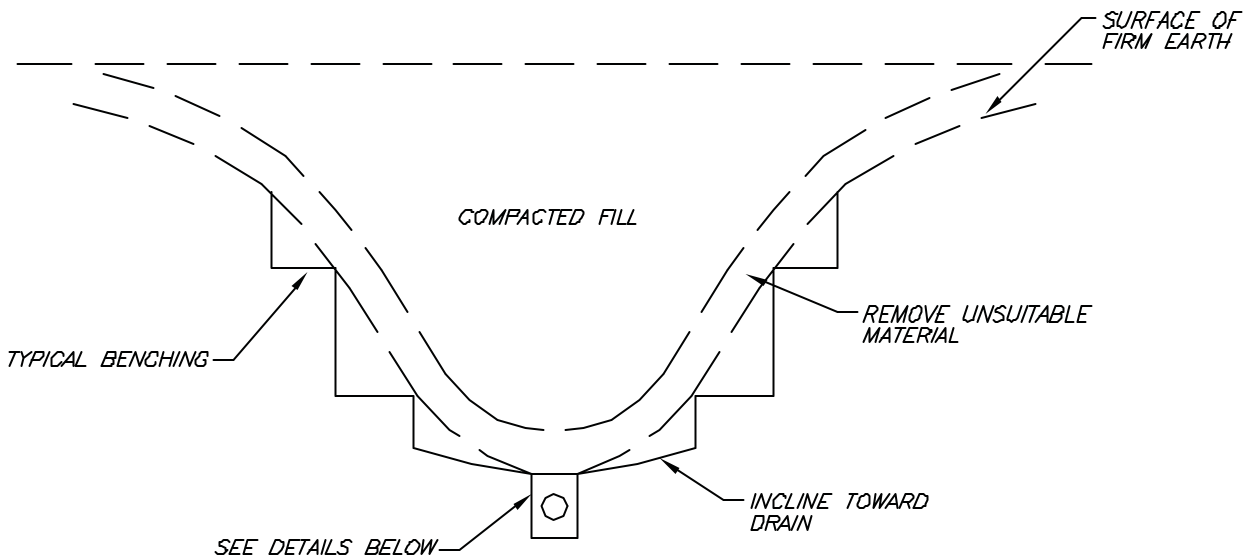
TYPICAL WINDROW DETAIL (EDGE VIEW)



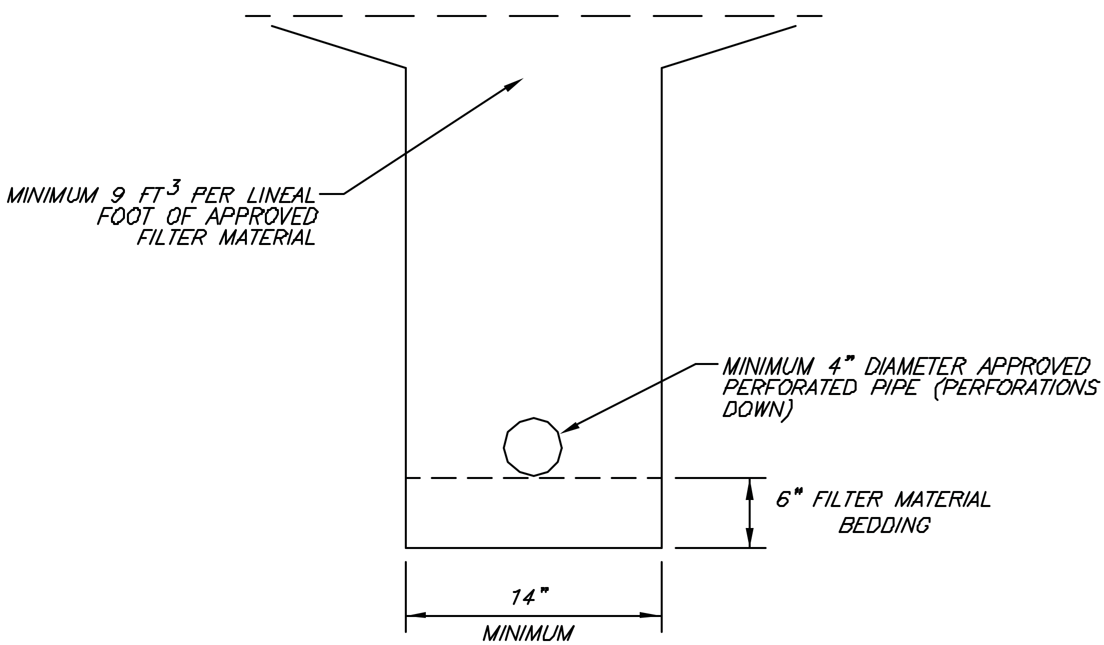
PROFILE VIEW



	ROCK DISPOSAL DETAIL	



TRENCH DETAIL



FILTER MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

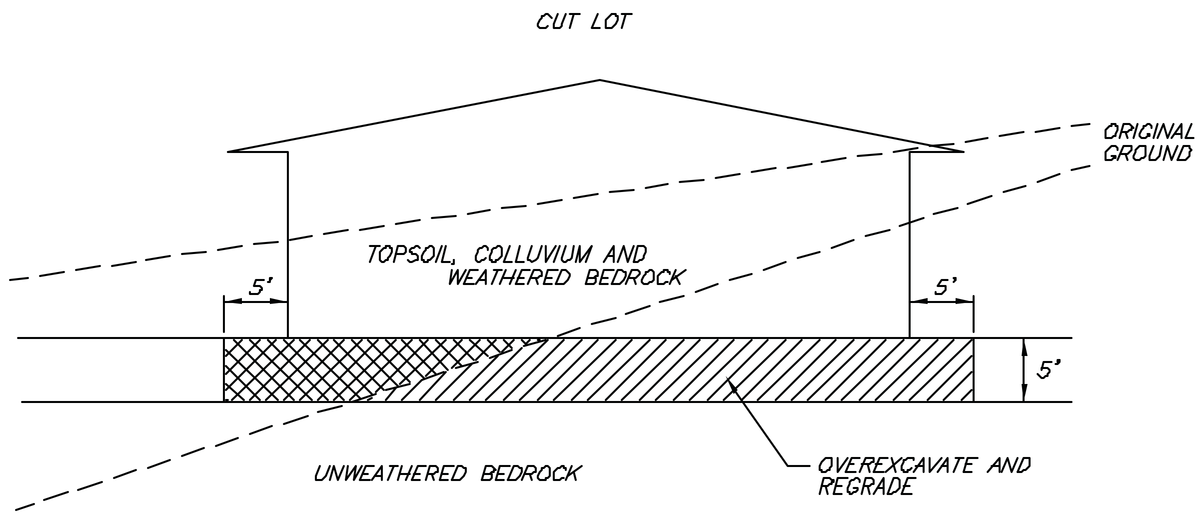
SIEVE SIZE	PERCENTAGE
1"	100
3/4"	90–100
3/8"	40–100
NO. 4	25–40
NO. 30	5–15
NO. 50	0–7
NO. 200	0–3

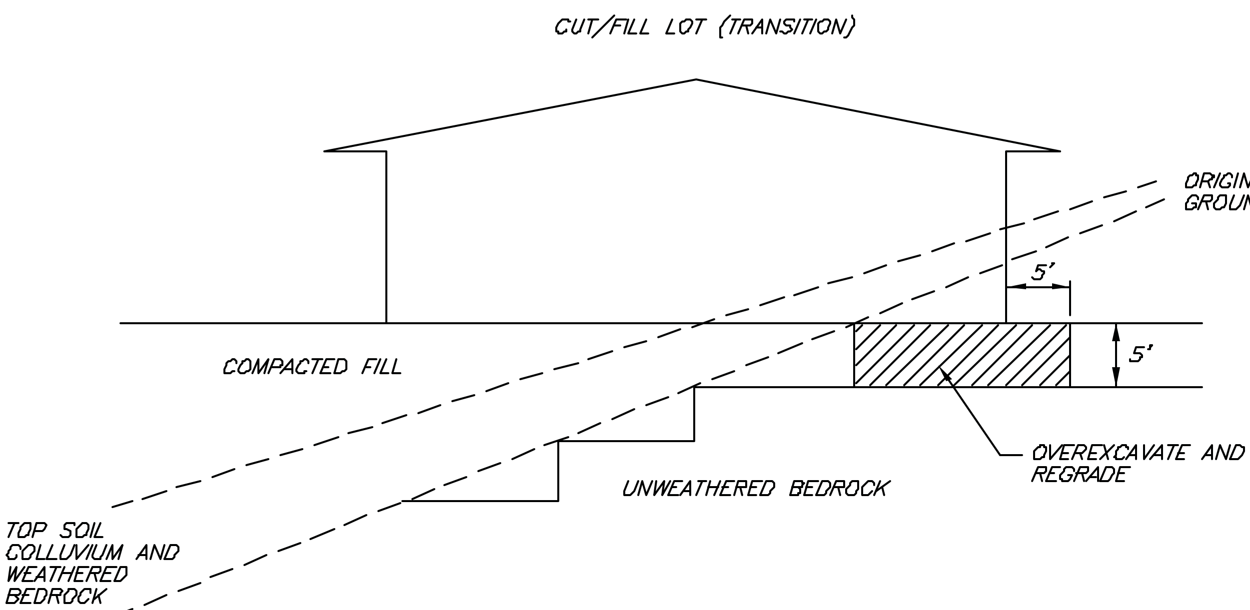
APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi.

PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA. SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING.

LENGTH OF RUN	PIPE DIAMETER
UPPER 500'	4"
NEXT 1000'	6"
> 1500'	8"

TYPICAL CANYON SUBDRAIN DETAIL





TRANSITION LOT DETAIL

Appendix F

SLOPE MAINTENANCE GUIDELINES

Hillside lots in general, and hillside slopes in particular, need maintenance to continue to function and retain their value. Many homeowners are unaware of this and allow deterioration of their property. In addition to his own property, the homeowner may be subject to liability for damage occurring to neighboring properties as a result of his negligence. It is therefore important to familiarize homeowners with some guidelines for maintenance of their properties and make them aware of the importance of maintenance.

Nature slowly wears away land, but human activities such as construction increase the rate of erosion 200, even 2,000 times that amount. When we remove vegetation or other objects that hold soil in place, we expose it to the action of wind and water, and increase its chance of eroding.

The following guidelines are provided for the protection of the homeowner's investment, and should be employed throughout the year.

(a) Care should be taken that slopes, terraces, berms (ridges at crown of slopes), and proper lot drainage are not disturbed. Surface drainage should be conducted from the rear yard to the street by a graded swale through the sideyard, or alternative approved devices.

(b) In general, roof and yard runoff should be conducted to either the street or storm drain by nonerosive devices such as sidewalks, drainage pipes, ground gutters, and driveways. Drainage systems should not be altered without expert consultation.

(c) All drains should be kept cleaned and unclogged, including gutters and downspouts. Terrace drains or gunite ditches should be kept free of debris to allow proper drainage. During heavy rain periods, performance of the drainage system should be inspected. Problems, such as gullying and ponding, if observed, should be corrected as soon as possible.

(d) Any leakage from pools, waterlines, etc. or bypassing of drains should be repaired as soon as possible.

(e) Animal burrows should be filled since they may cause diversion of surface runoff, promote accelerated erosion, and even trigger shallow soil failures.

(f) Slopes should not be altered without expert consultation. Whenever a homeowner plans a significant topographic modification of the lot or slope, a qualified geotechnical consultant should be contacted.

(g) If plans for modification of cut, fill, or natural slopes within a property are considered, an engineering geologist should be consulted. Any oversteepening may result in a need for expensive retaining devices. Undercutting of the bottom of a slope might possibly lead to slope instability or failure and should not be undertaken without expert consultation.

(h) If unusual racking, settling, or earth slippage occurs on the property, the homeowner should consult a qualified soil engineer or an engineering geologist immediately.

(i) The most common causes of slope erosion and shallow slope failures are as follows:

- ❖ Gross negligent of the care and maintenance of the slopes and drainage devices.
- ❖ Inadequate and/or improper planting. (Barren areas should be replanted as soon as possible.)
- ❖ Excessive or insufficient irrigation or diversion of runoff over the slope.
- ❖ Foot traffic on slopes destroying vegetation and exposing soil to erosion potential.

(j) Homeowners should not let conditions on their property create a problem for their neighbors. Cooperation with neighbors could prevent problems; also increase the aesthetic attractiveness of the property.

WINTER ALERT

It is especially important to "winterize" your property by mid-September. Don't wait until spring to put in landscaping. You need winter protection. Final landscaping can be done later. Inexpensive measures installed by mid-September will give you protection quickly that will last all during the wet season.

- ❖ Check before storms to see that drains, gutters, downspouts, and ditches are not clogged by leaves and rubble.
- ❖ Check after major storms to be sure drains are clear and vegetation is holding on slopes. Repair as necessary.
- ❖ Spot seed any bare areas. Broadcast seeds or use a mechanical seeder. A typical slope or bare areas can be done in less than an hour.
- ❖ Give seeds a boost with fertilizer.
- ❖ Mulch if you can, with grass clippings and leaves, bark chips or straw.
- ❖ Use netting to hold soil and seeds on steep slopes.

- Check with your landscape architect or local nursery for advice.
- Prepare berms and ditches to drain surface runoff water away from problem areas such as steep, bare slopes.
- Prepare base areas on slopes for seeding by raking the surface to loosen and roughen soil so it will hold seeds.

CONSTRUCTION

- Plan construction activities during spring and summer, so that erosion control measures can be in place when the rain comes.
- Examine your site carefully before building. Be aware of the slope, drainage patterns and soil types. Proper site design will help you avoid expensive stabilization work.
- Preserve existing vegetation as much as possible. Vegetation will naturally curb erosion, improve the appearance and value of your property, and reduce the cost of landscaping later.
- Use fencing to protect plants from fill material and traffic. If you have to pave near trees, do so with permeable asphalt or porous paving blocks.
- Minimize the length and steepness of slopes by benching, terracing, or constructing diversion structures. Landscape benched areas to stabilize the slope and improve its appearance.
- As soon as possible after grading a site, plant vegetation on all areas that are not to be paved or otherwise covered.

TEMPORARY MEASURES TO STABILIZE THE SOIL

Grass provides the cheapest and most effective short-term erosion control. It grows quickly and covers the ground completely. To find the best seed mixtures and plants for your area, check with your local landscape architect, local nursery, or the U.S. Department of Agriculture Soil Conservation Service. Mulches hold soil moisture and provide ground protection from rain drainage. They also provide a favorable environment for starting and growing plants. Easy-to-obtain mulches are grass clippings, leaves, sawdust, bark chips, and straw.

Straw mulch is nearly 100 percent effective when held in place by spraying with an organic glue or wood fiber (tackifiers), by punching it into the soil with a shovel or roller, or by tacking a netting over it.

Commercial applications of wood fibers combined with various seeds and fertilizers (hydraulic mulching) are effective in stabilizing sloped areas. Hydraulic mulching with a tackifier should be done in two separate applications; the first composed of seed fertilizer and half the mulch, the second composed of the remaining mulch and tackifier. Commercial hydraulic mulch applicators – who also provide other erosion control services – are listed under “landscaping” in the phone book.

Mats of excelsior, jute netting, and plastic sheets can be effective temporary covers, but they must be in contact with the soil and fastened securely to work effectively.

Roof drainage can be collected in barrels or storage containers or touted into lawns, planter boxes, and gardens. Be sure to cover stored water so you don’t collect mosquitoes. Excessive runoff should be directed away from your house. Too much water can damage tress and make foundations unstable.

STRUCTURAL RUNOFF CONTROLS

Even with proper timing and planting, you may need to protect disturbed areas from rainfall until the plants have time to establish themselves. Or you may need permanent ways to transport water across your property so that it doesn’t cause erosion.

To keep water from carrying soil from your site and dumping it into nearby lots, streets, streams and channels, you need ways to reduce its volume and speed. Some examples of what you might use are:

- Riprap (rock lining) – to protect channel banks from erosive water flow.
- Sediment trap – to stop runoff carrying sediment and trap the sediment.
- Storm drain outlet protection – to reduce the speed of water flowing from a pipe onto open ground or into a natural channel.
- Diversion dike or perimeter dike – to divert excess water to places where it can be disposed of properly.
- Straw bale dike – to stop and detain sediment from small-unprotected areas (a short-term measure).
- Perimeter swale – to divert runoff from a disturbed area or to contain runoff within a disturbed area.
- Grade stabilization structure – to carry concentrated runoff down a slope.

GEOTECHNICAL EVALUATION

Protea Senior Living Oceanside, LLC
Proposed "Ocean Hills Phase 2" Senior Facility Development
4500 Cannon Road
Assessor's Parcel Number (APN): 169-562-01
City of Oceanside, County of San Diego, California 92056

October 29, 2018

EEI Project AAA-72646.4

Corporate Office: 2195 Faraday Ave., Suite K, Carlsbad, CA 92008-7207 • Ph: 760-431-3747 www.eeitiger.com
Camarillo • Carlsbad • Pleasanton • Sacramento • Reno

GEOTECHNICAL EVALUATION

Prepared for:

Mr. Greg Spiro
Principal-Protea Capitol Partners
Protea Senior Living Oceanside, LLC
18 Ventana Ridge Drive
Aliso Viejo, CA 92656

Subject Property Location:

Protea Capital Partners
Proposed "Ocean Hills Phase 2" Senior Facility Development
4500 Cannon Rd.
Assessor's Parcel Number (APN): 169-562-01
City of Oceanside, County of San Diego, California 92056

Prepared by:

Matthew Cruz
Staff Geologist

Jeffrey P. Blake
CEG 2248 (exp. 10/31/19)
Principal Engineering Geologist

Jerry L. Michal
GE 2515 (exp. 3/31/20)
Senior Geotechnical Engineer

EEI
2195 Faraday Avenue, Suite K
Carlsbad, California 92008-7207

EEI Project AAA-72646.4

TABLE OF CONTENTS

TABLE OF CONTENTS (con't)

Distribution: (2) Addressee one electronic copy

1.0 INTRODUCTION

1.1 Purpose

The purpose of this Geotechnical Evaluation is to provide preliminary geotechnical information to Protea Senior Living Oceanside, LLC ("Client") regarding the subject property in the City of Oceanside, San Diego County, California. The information gathered in this evaluation is intended to provide the Client with an understanding of the physical conditions of site-specific subsurface soils, groundwater, and the regional geologic setting which could affect the cost or design of the proposed development at the property (**Figure 1** -Site Vicinity Map, **Figure 2**-Aerial Site Map).

This Geotechnical Evaluation has been conducted in general accordance with accepted geotechnical engineering principles and in general conformance with the approved proposal and cost estimate for the project by EEI, dated September 27, 2018.

EEI conducted onsite field exploration on October 9, 2018, that included drilling and sampling of thirteen (13) hollow-stem auger geotechnical borings for the proposed development at the subject property. We conducted two (2) percolation tests in conjunction with our field exploration. This Geotechnical Evaluation has been prepared for the sole use of Protea Senior Living Oceanside, LLC. Other parties, without the express written consent of EEI and Protea Senior Living Oceanside, LLC should not rely upon this Geotechnical Evaluation.

1.2 Project Description

Based on information provided by the Client (a site layout plan titled "Oceanside Senior Living: Site Plan" by Irwin Partners Architects, 2018), we understand that development of the subject property will consist of a new senior living facilities including 102 studio, one bedroom, and two bedroom apartments, a pool/spa area, lounge/sports bar, theater, patio spaces, dining room, gym, administrative buildings, paved parking and drive areas, a storm-water detention basin, and other related improvements. No other information is known at this time.

No detailed grading plans were provided to EEI at the time of our preparation of this report; however, grading is anticipated to include cuts and fills of less than 5 feet across the subject property (exclusive of remedial grading). No foundation plans were provided to EEI at the time of report preparation; however, foundation loads are assumed to be typical for the type of construction.

1.3 Scope of Services

The scope of our services included:

- A review of readily available data pertinent to the subject property, including published and unpublished geologic reports/maps, and soils data for the area (**References**).

- Conducting a geotechnical reconnaissance of the subject property and nearby vicinity.

- Coordination with Underground Service Alert (USA) to identify the presence of underground utilities for clearance of proposed boring locations.

- Drilling and logging of thirteen (13) small diameter exploratory borings in readily accessible areas of the subject property to depths of approximately 6 feet to 17.5 feet below the ground surface (bgs), including conducting percolation testing at two (2) of the boring locations. The approximate locations of each of our borings and percolation tests are presented on **Figure 3** (Geotechnical Map).

- An evaluation of seismicity and geologic hazards including an evaluation of faulting and liquefaction potential.

- Completion of laboratory testing of representative earth materials encountered onsite to ascertain their pertinent soils engineering properties, including corrosion potential (**Appendix B**).

- The preparation of this report which presents our preliminary findings, conclusions, and recommendations.

2.0 BACKGROUND

2.1 Subject Property Description

Based on the information provided by Client and a review of the GoogleEarth® online imagery, the overall subject property is located at 4500 Cannon Rd.; north of the intersection between Cannon Rd. and Mystra Dr. in the City of Oceanside, San Diego County, California. The property comprises roughly 6.3-acres and is identified by the Assessor's Parcel Number (APN) is 169-562-01-00. The southern part of the property is currently under development as Phase I of the Ocean Hills Senior Living Facility, and northern part of the property, which is the subject site of this report, is currently undeveloped, and is being currently being used as storage for heavy equipment and construction supplies. The property is bordered by Cannon Rd. to the southeast; Mystra Dr. to the west, and single-family residential developments to the north and east.

The center of the subject property is approximately situated at 33.1662° north latitude and 117.2690° west longitude (GoogleEarth®, 2018).

2.2 Topography

The subject property is located in the 7.5-minute San Luis Rey quadrangle. The property is relatively flat lying and the elevation is approximately 385 feet above sea level (USGS, 2018).

3.0 FIELD EXPLORATION, SUBSURFACE CONDITIONS AND LABORATORY TESTING

3.1 Field Exploration

Field work for our Geotechnical Evaluation was conducted on October 9, 2018. A total of thirteen (13) hollow-stem auger borings were advanced at the subject property in readily accessible areas. Boring depths ranged from approximately 6 to 17.5 feet bgs and were logged under the supervision of a Registered Professional Engineer and Certified Engineering Geologist at EEI. Refusal occurred in all of the borings. The approximate locations of the borings are shown on **Figure 3**.

A truck mounted CME-55 hollow-stem auger (HSA) drill rig was used to advance borings B-1/P-1 through B-13. Blow count (N) values were determined utilizing a 140-pound hammer, falling 30-inches onto a Standard Penetration Test (SPT) split-spoon sampler and a Modified California split-tube sampler.

The blows per 6-inch increment required to advance the 18-inch long SPT and 18-inch long Modified California split-tube samplers were measured at various depth intervals (varying between 2 to 10 feet), or at changes in lithology, recorded on the boring logs, and are presented in **Appendix A** (Soil Classification Chart and Boring Logs). Energy-corrected SPT N_{60} values are also presented on the borings logs.

Relatively "undisturbed" samples were collected in a 2.42-inch (inside diameter) California Modified split-tube sampler for visual examination and laboratory testing. The soils were classified in accordance with the Unified Soil Classification System (ASTM, 2015). Representative bulk samples were also collected for appropriate laboratory testing.

3.2 Laboratory Testing

Selected samples obtained from our borings were tested to evaluate pertinent soil classification and engineering properties and enable development of geotechnical conclusions and recommendations. The laboratory tests consisted of:

- Moisture Content and Dry Density
- Expansion Index
- Maximum Dry Density and Optimum Moisture
- Direct Shear
- R-Value
- Corrosivity

The results of the laboratory tests, and brief explanations of test procedures, are presented in **Appendix B**. It should be understood that the results provided in **Appendix B** are based upon pre-development conditions. Verification testing is recommended at the conclusion of grading on samples collected at or near finish grade.

4.0 GEOLOGIC SETTING AND SUBSURFACE CONDITIONS

4.1 Geologic Setting

Regionally, the subject property lies within the Peninsular Ranges Geomorphic Province of southern California. This province consists of a series of ranges separated by northwest trending valleys; sub parallel to branches of the San Andreas Fault (CGS, 2002). The Peninsular Ranges geomorphic province, one of the largest geomorphic units in western North America, extends from the Transverse Ranges geomorphic province and the Los Angeles Basin, south to Baja California. It is bound on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province. The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks (CGS, 2002). Major fault zones and subordinate fault zones found in the Peninsular Ranges Province typically trend in a northwest-southeast direction.

Regional geologic maps of the subject property and vicinity (Kennedy & Tan, 2007) indicate the property is underlain by sedimentary units consisting of sandstone, siltstone, claystone, and conglomerate of the Eocene Santiago Formation, and weathered to un-weathered Cretaceous Granitic rocks (map symbols Ts and Kg, respectively). Undocumented artificial fill is also anticipated to overlie the bedrock units across the subject property.

4.2 Subsurface Conditions

The subsurface materials encountered in our exploratory borings consisted of fill, alluvium, sedimentary formational deposits and granitic materials. A brief description of the subsurface conditions encountered is provided in the following section. Detailed descriptions of the subsurface conditions are provided on the boring logs included in **Appendix A**.

Undocumented Fill – Fill was encountered in all of our exploratory borings. The fill consisted of tan to brown to reddish brown silty sand, silty clay, clay, and sandy silt. Fragments of Santiago Formation siltstone and sandstone were encountered, and smaller fragments of granitics and claystone are common. These materials were observed to be typically damp to slightly moist and medium dense/stiff at the time of our subsurface exploration. The depth of fill is variable and generally ranged from approximately 4 to 11 feet bgs. We are not aware of any documentation of the fill placement. Therefore, the fill is considered undocumented and subject to removal and recompaction.

Quaternary-aged Alluvium – Quaternary-aged Alluvial deposits were encountered in exploratory borings B-6, B-9, B-11, B-12, and B-13 underlying the fill to maximum depths of approximately 13 feet bgs. These alluvial deposits consist of silty and clayey sand, sandy silt and gravelly sand to sandy gravel. The alluvial deposits are dark brown to black in color and contain roots and minor organic material. These materials were observed to be typically moist to wet and stiff/loose to medium dense at the time of our subsurface exploration.

Eocene Santiago Formation – The Eocene aged Santiago Formation was encountered in exploratory borings B-7 and B-9, underlying Fill/Alluvium at a depth of 9.5 to 13 feet bgs. The Santiago Formation consists of grayish-brown to reddish-brown claystone that has common orange-red oxidized streaks, and some gravel. The claystone excavates to clay, and was damp to moist and medium stiff to stiff at the time of our subsurface exploration.

Cretaceous Decomposed Granitics – Cretaceous aged granitic bedrock underlies the site and was encountered in exploratory borings B-1, B-2, B-3, B-4, B-5, B-6, B-8, B-11, and B-13 underlying fill and alluvium at depths of approximately 4 to 11 feet bgs. The granitics are reddish brown to dark brown mottled, and oxidized. The granitics were damp and very dense at the time of our subsurface exploration. Refusal was encountered in our borings in the granitic materials at depths of between approximately 6 to 17.5 feet.

4.3 Groundwater

Groundwater was not encountered in any of our HSA borings. It should be noted that variations in groundwater may result from fluctuations in the ground surface topography, subsurface stratification, rainfall, irrigation, and other factors that may not have been evident at the time of our subsurface exploration.

5.0 GEOLOGIC HAZARDS

5.1 California Building Code Seismic Design Parameters

EEI utilized seismic design criteria provided in the CBC (2016) and ASCE 7-10. Final selection of the appropriate seismic design coefficients should be made by the structural consultant based on the local laws and ordinances, expected building response, and desired level of conservatism. The site coefficients and adjusted maximum considered earthquake spectral response accelerations in accordance with the 2016 California Building Code are presented in **Table 1**.

TABLE 1
2016 CBC Seismic Parameters and Peak Ground Acceleration

Parameter	Value
Site Coordinates	Latitude 33.1662° Longitude -117.2690°
Mapped Spectral Acceleration Value at Short Period: $\mathbf{S_s}$	1.048g
Mapped Spectral Acceleration Value at 1-Second Period: $\mathbf{S_1}$	0.407g
Site Classification	C
Short Period Site Coefficient: $\mathbf{F_a}$	1.000
1-Second Period Site Coefficient: $\mathbf{F_v}$	1.393
Design Spectral Response Acceleration at Short Periods: $\mathbf{S_{DS}}$	0.699g
Design Spectral Response Acceleration at 1-Second Period: $\mathbf{S_{D1}}$	0.378g
Peak Ground Acceleration adjusted for Site Class Effects: $\mathbf{PGA_M}$	0.399g

5.2 Faulting and Surface Rupture

The subject property is located within an area of California known to contain a number of active and potentially active faults. There are no known active faults crossing the property (Jennings and Bryant, 2010) and the property is not within a State of California Earthquake Fault Zone (Hart and Bryant, 1997; CDMG, 2000). The closest known active fault is the Newport-Inglewood-Rose Canyon Fault Zone, located offshore approximately 8.39 miles west of the property (USGS, 2008). Therefore, the potential for surface rupture at the property is considered low. Three of the closest faults along with their distance from the property and Maximum Magnitude are shown in **Table 2.**

TABLE 2
Nearby Active Faults

Fault	Distance in Miles (Kilometers)[1]	Maximum Magnitude[1]
Newport-Inglewood-Rose Canyon (Offshore)	8.39 (13.50)	7.5
Elsinore	19.28 (31.03)	7.7
Coronado Bank (Offshore)	24.31 (39.12)	7.4
Palos Verde (Offshore)	24.31 (39.12)	7.7

1. USGS Online Fault Search (2008)

5.3 Landslides and Slope Stability

No landslides underlie the site nor are mapped in the immediate vicinity. As a result, we consider the potential for landslides or slope instabilities to occur at the property to be very low.

5.4 Liquefaction and Dynamic Settlement

Liquefaction occurs when loose, saturated sands and silts are subjected to strong ground shaking. The strong ground shaking causes pore-water pressure to rise and soils lose shear strength and temporarily behave as a liquid; potentially resulting in large total and differential ground surface settlements as well as possible lateral spreading during an earthquake.

Based on the shallow depth of dense to very dense bedrock materials and the lack of shallow groundwater underlying the site, the potential for liquefaction to occur is considered very low. Accordingly, the potential for liquefaction induced lateral spreading and seismic induced settlement is also considered to be very low.

5.5 Tsunamis, Flooding and Seiches

EEI reviewed the CGS Tsunami Inundation Map for the San Luis Rey quadrangle and determined that the subject property is not located within a Tsunami Evacuation Area; therefore, damage due to tsunamis and is considered low (CGS, 2009).

EEI reviewed the Federal Emergency Management Agency (FEMA, 2012) Flood Insurance Rate Map (FIRM) panels 06073C0767G to determine if the subject property was located within an area designated as a Flood Hazard Zone. The property is within Zone X described as an area determined to be outside the 0.2 percent annual chance floodplain; therefore, the damage due to flooding is considered low.

Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays, or reservoirs. The subject property is not located immediately adjacent to any lakes or confined bodies of water; therefore, the potential for a seiche to affect the site is considered low.

5.6 Expansive Soil

Laboratory test results indicate the near surface onsite soils have a low expansion potential (EI = 43). The expansion potential of these materials is not considered to pose a hazard for the proposed development.

6.0 CONCLUSIONS

Based on our field exploration, laboratory testing and engineering and geologic analysis, it is our opinion that the subject property is suitable for the proposed senior living residential development project from a geotechnical engineering and geologic viewpoint; however, there are existing geotechnical conditions associated with the property that will warrant mitigation and/or consideration during planning stages. If site plans and/or the proposed building locations are revised, additional field studies may be warranted to address proposed site-specific conditions. The main geotechnical conclusions for the project are presented in the following text.

- A total of thirteen (13) exploratory borings were advanced within the subject property during this evaluation. The boring depths ranged from 6 to 17.5 feet bgs. The property is underlain by undocumented fill, alluvium, the Eocene Santiago Formation and Cretaceous-aged granitics.

- Groundwater was not encountered in any of our exploratory borings to the maximum explored depth of 17.5 feet bgs.

- Standard heavy-duty grading equipment is anticipated to excavate the fill soils, as well as the alluvial deposits and Santiago formation; however, granitic bedrock materials that contain very dense and hard zones requiring heavy ripping with a single shank, or a "rock breaker" should be anticipated.

- The subject property is located within an area of southern California recognized as having a number of active and potentially-active faults located nearby. Our review indicates that there are no known active faults mapped as crossing the property and the property is not located within an Earthquake Fault Zone.

- Based on EEI's evaluation, Earth materials underlying the subject property are not considered susceptible to seismic settlement. The potential for liquefaction and seismic induced settlement are considered very low and are not considered a geotechnical concern.

- The onsite soils are predominantly silty sands and in general are anticipated to have a low expansion potential (EI ≤ 50). It should be noted, however, that localized clayey soils could potentially be expansive (EI > 50), and should be further evaluated during future studies or during earthwork when the proposed building pads are near finish grade.

- The existing fill and alluvial deposits are variable in density and are considered potentially compressible. As such, they are considered unsuitable for the support of settlement-sensitive structures or additional fill in their current condition. Therefore, these materials should be completely removed and recompacted in those areas to receive additional fill, proposed buildings and other settlement-sensitive improvements. Based on the results of our subsurface exploration, we anticipate that these removals will need to extend on the order of approximately 5 to 17 feet below existing site grades.

- A conventional shallow foundation system in conjunction with a concrete slab-on-grade floor appears to be suitable for support of the proposed residential buildings.

7.0 RECOMMENDATIONS

The recommendations presented herein should be incorporated into the planning and design phases of development. Guidelines for site preparation, earthwork, and onsite improvements are provided in the following sections.

7.1 General

Grading should conform to the guidelines presented in the 2016 California Building Code (CBC, 2016), as well as the requirements of the City of Oceanside. Additionally, general Earthwork and Grading Guidelines are provided herein as **Appendix E**.

During earthwork construction, removals and reprocessing of soft or unsuitable fill and alluvial materials, as well as general grading procedures of the contractor should be observed and the fill placed should be selectively tested by representatives of the geotechnical engineer, EEI. If any unusual or unexpected conditions are exposed in the field, they should be reviewed by the geotechnical engineer and if warranted, modified and/or additional recommendations will be offered. Specific guidelines and comments pertinent to the planned development are provided herein.

The recommendations presented herein have been completed using the preliminary information provided to us regarding site development. EEI should be provided with grading and foundation plans once they are available so that we can determine if the recommendations provided in this report remain applicable.

7.2 Site Preparation and Grading

Debris and other deleterious material, such as organic soils, tree rootballs and/or environmentally impacted earth materials (if any) should be removed from the subject property prior to the start of grading. All undocumented fill/backfill should be removed and recompacted. Areas to receive fill should be properly scarified and/or benched in accordance with current industry standards of practice and guidelines specified in the CBC (2016) and the requirements of the local jurisdiction.

Abandoned trenches should be properly backfilled and tested. If unanticipated subsurface improvements (utility lines, septic systems, wells, utilities, etc.) are encountered during earthwork construction, the Geotechnical Engineer should be informed and appropriate remedial recommendations would then be provided.

7.3 Remedial Earthwork

Remedial grading for the proposed residential building pads and for pavement and hardscape areas is provided in the following sections. Unless noted otherwise, fill should be moisture conditioned to at least the optimum moisture content and compacted to at least 90 percent of the maximum dry density (based on ASTM D1557).

Building Pads and other Settlement Sensitive Structures: The existing fill materials are undocumented, variable in density, possess variable expansion potential, and are considered potentially compressible. Underlying alluvial materials vary in density and moisture, and are also considered potentially compressible. As such, the fill and alluvial soils are considered unsuitable for the support of settlement-sensitive structures or additional fill in their current condition.

Based on this information, we recommend the removal (over-excavation) and re-compaction of the fill and alluvial materials within the proposed grading limits of the building pad areas and other settlement sensitive structures. Therefore, where not already removed by the proposed site grading, the existing undocumented fill and underlying alluvium should be completely removed and recompacted in those areas to receive additional fill, proposed buildings and other settlement-sensitive improvements in order to help reduce the expansion potential of locally clayey materials, and provide relatively uniform soil bearing conditions in the proposed development areas. Based on the results of our subsurface exploration and geotechnical evaluation, we recommend that the removals extend down to the relatively competent Santiago Formation or Granitic bedrock materials. Removals of the potentially compressible materials identified herein are anticipated to range from approximately 5 to 15 feet. The removals should extend to a minimum of 5 feet bgs or 18-inches below the bottom of foundations, whichever is deeper in the proposed building area. The remedial earthwork should extend a minimum of 5 feet beyond the proposed area to support fill and/or settlement sensitive improvements.

The resulting excavation(s) for the removals should be observed by a representative of EEI to check that unsuitable materials have been sufficiently removed. It should be understood that based on the observations of our field representative, localized deeper removals may be recommended. The base of the removal area should be level to avoid differential fill thicknesses under proposed improvements. Note that vertical sides exceeding five feet in depth may be prone to sloughing and may require laying back to an inclination of 1:1 (horizontal to vertical). Some locations that are close to property lines and existing improvements may require temporary shoring or slot cutting methods. The base of the removals should be scarified to a minimum depth of 6-inches, moisture conditioned as needed to achieve at least optimum moisture content and re-compacted to at least 90 percent of the maximum dry density (based on ASTM D1557). The over-excavated areas should then be backfilled with onsite and/or imported soils that are placed and compacted as recommended herein until design finish grades are reached.

Other Settlement Sensitive Structures: Similar remedial grading should be performed below other settlement sensitive improvements such as retaining walls and street improvements, pool areas and hardscape areas. If over-excavations for improvements are not performed in these areas, these improvements may be subject to settlement.

7.4 Fill Material and Placement

Fill materials should be compacted to at least 90 percent of the maximum dry density (based on ASTM D1557). Unless noted otherwise, fill should be moisture conditioned to at least 2 percent above the optimum moisture content and compacted to at least 90 percent of the maximum dry density (based on ASTM D1557). Fill material should be free of organic matter (less than 3 percent organics by weight) and other deleterious material. Fill material should not contain rocks greater than 6-inches in maximum dimension, organic debris and other deleterious materials. Rock fragments exceeding 6-inches in one dimension should be segregated and exported from the subject property or utilized for landscaping.

Conventional Shallow Foundations with Slab on Grade: Fill within 4 feet of pad grade should consist of low expansion potential material (EI < 50). The low-expansion potential material should extend at least 5 feet beyond the building perimeter.

Hardscape: Fill within 2 feet of hardscape subgrade should consist of low-expansive material (EI < 50). The low-expansion potential material should extend at least 2 feet beyond the hardscape.

If import soils are needed, the earthwork contractor should ensure that all proposed fill materials are approved by the Geotechnical Engineer prior to use. Representative soil samples should be made available for testing at least ten (10) working days prior to hauling to the property to allow for laboratory tests.

Those areas to receive fill or surface improvements should be scarified at least 6-inches; moisture conditioned to at least 2 percent over optimum moisture content and re-compacted to at least 90 percent of the maximum dry density (based on ASTM D1557). The subgrade should be thoroughly and uniformly moistened prior to placing concrete.

7.5 Expansive Soil

The onsite soils are anticipated to possess a low expansion potential (EI=21-50). The recommendations presented in this report reflect a low expansion potential.

7.6 Yielding Subgrade Conditions

The soils encountered at the subject property can exhibit "pumping" or yielding if they become saturated. This can often occur in response to periods of significant precipitation, such as during the winter rainy season. If this occurs and in order to help stabilize the yielding subgrade soils within the bottom of the removal areas, the contractor can consider the placement of stabilization fabric or geo-grid over the yielding areas, depending on the relative severity. Mirafi 600X (or approved equivalent) stabilization fabric may be used for areas with low to moderate yielding conditions.

Geo-grid such as Tensar TX-5 may be used for areas with moderate to severe yielding conditions. Uniform sized, ¾- to 2-inch crushed rock should be placed over the stabilization fabric or geo-grid. A 6- to 12-inch thick section of crushed rock will typically be necessary to stabilize yielding ground.

If significant voids are present in the crushed gravel, a filter fabric should be placed over the crushed gravel to prevent migration of fines into the gravel and subsequent settlement of the overlying fill. Fill soils, which should be placed and compacted in accordance with the recommendations presented herein, should then be placed over the fabric or geo-grid until design finish grades are reached. The crushed gravel and stabilization fabric or geo-grid should extend at least 5 feet laterally beyond the limits of the yielding areas. These operations should be performed under the observation and testing of a representative of EEI in order to evaluate the effectiveness of these measures and to provide additional recommendations for mitigation, as necessary.

7.7 Shrinkage and Bulking

Several factors will impact earthwork balancing on the subject property, including shrinkage, bulking, subsidence, trench spoils from utilities and footing excavations, and final pavement section thickness as well as the accuracy of topography. Shrinkage, bulking and subsidence are primarily dependent upon the degree of compactive effort achieved during construction. Shrinkage, bulking and subsidence should be considered by the project civil engineer relative to final site balancing. It is recommended that the site development be planned to include an area that could be raised or lowered to accommodate final site balancing.

7.8 Temporary Site Excavations

Based on the results of our subsurface exploration, we anticipate that excavations can generally be accomplished by conventional heavy duty earth moving equipment in good working condition. However, excavations may encounter localized harder, cemented zones that may require air hammer attachments to excavators, or specialized excavation equipment. Excavations in the onsite materials could generate oversize materials. Oversize materials should be placed in accordance with **Section 7.5** and the Earthwork and Grading Guidelines.

Temporary excavations within the onsite materials (considered to be a Type C soil per OSHA guidelines) should be stable at 1.5H:1V inclinations for short durations during construction, and where cuts do not exceed 15 feet in height. Some sloughing of surface soils should be anticipated. Temporary excavations 4 feet deep or less can be made vertically.

The faces of temporary slopes should be inspected daily by the contractor's Competent Person before personnel are allowed to enter the excavation. Any zones of potential instability, sloughing or raveling should be brought to the attention of the Engineer and corrective action implemented before personnel begin working in the excavation.

Excavated soils should not be stockpiled behind temporary excavations within a distance equal to the depth of the excavation. EEI should be notified if other surcharge loads are anticipated so that lateral load criteria can be developed for the specific situation. If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to prevent runoff water from entering the excavation and eroding the slope faces.

8.0 FOUNDATION RECOMMENDATIONS

8.1 General

In the event that plans concerning the proposed building structures are revised in the project design and/or location or loading conditions of the planned structures are made, conclusions and recommendations contained in this report should not be considered valid unless they are reviewed, revised and/or approved in writing by EEI.

8.2 Preliminary Foundation Design

The following design parameters assume that the minimum recommended remedial grading will be performed, and that foundations for the proposed residential buildings will consist of conventional shallow foundations with a slab on grade. The foundation recommendations provided herein are based on the soil materials within 30-inches of foundation level possessing a low expansion potential (EI<50). Recommendations by the project's design-structural engineer or architect may exceed the following minimum recommendations.

In preparation for foundation construction, the earthwork contractor should ensure that the site has been prepared as recommended, and that field density tests have been performed to adequately document the relative compaction of structural fill. Foundation design recommendations for the proposed structure is provided in the following sections of this report.

8.2.1 Conventional Shallow Foundations

For proposed one-story wood frame residential buildings, conventional continuous and/or isolated shallow spread footings should bear entirely on compacted fill with remedial grading as described in previous sections of this report. Foundations should be constructed with an embedment of at least 12-inches below finish grade and a minimum width of 12-inches. Isolated footings should have a minimum width of 24-inches. An allowable bearing capacity of 2,000 pounds per square foot (psf) can be used for footings extending at least 12-inches below lowest adjacent finished grade. The allowable bearing may be increased by 750 psf for each additional 12-inches of embedment up to a maximum bearing of 3,000 psf. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces.

For proposed two-story wood frame residential buildings, conventional continuous and/or isolated shallow spread footings should bear entirely on compacted fill with remedial grading as described in previous sections of this report. Foundations should be constructed with an embedment of at least 18-inches below finish grade and a minimum width of 15-inches. Isolated footings should have a minimum width of 24-inches. An allowable bearing capacity of 2,000 pounds per square foot (psf) can be used for footings extending at least 12-inches below lowest adjacent finished grade. The allowable bearing may be increased by 750 psf for each additional 12-inches of embedment up to a maximum bearing of 3,000 psf. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces.

For proposed three-story wood frame residential buildings, conventional continuous and/or isolated shallow spread footings should bear entirely on compacted fill with remedial grading as described in previous sections of this report. Foundations should be constructed with an embedment of at least 24-inches below finish grade and a minimum width of 18-inches. Isolated footings should have a minimum width of 24-inches. An allowable bearing capacity of 2,000 pounds per square foot (psf) can be used for footings extending at least 24-inches below lowest adjacent finished grade. The allowable bearing may be increased by 750 psf for each additional 12-inches of embedment up to a maximum bearing of 3,000 psf. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces.

Based on the prevailing geotechnical conditions encountered during our geotechnical evaluation as described herein, we recommend that foundations be reinforced with at least two No. 4 bars, one placed at the top of the footing and one placed at the bottom.

The recommendations for footings sizes and reinforcement are considered minimums and are not intended to supersede the design of the project structural engineer.

8.3 Lateral loads

Lateral loads will be resisted by friction between the bottoms of foundations and passive pressure on the faces of footings and other structural elements below grade. An allowable passive pressure of 300 psf per foot of depth can be used for the portion of the foundation below grade. An allowable coefficient of friction of 0.30 can be used. The passive pressure can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. The upper one-foot of soil should not be relied on for passive support unless the ground is covered with pavements or slabs.

8.4 Settlement

Settlement estimates for conventional foundations are as follows:

- Static Total Settlement: Less than 1-inch
- Static Differential Settlement: Less than ½-inch over a distance of 40 feet

8.5 Footing Setbacks

Footings adjacent to unlined drainage swales or underground utilities (if any) should be deepened to a minimum of 6-inches below the invert of the adjacent unlined swale or utilities. This distance is measured from the footing face at the bearing elevation. Footings for structures adjacent to retaining walls should be deepened so as to extend below a 1:1 projection from the heel of the wall. Alternatively, walls may be designed to accommodate structural loads from buildings or appurtenances.

8.6 Conventional Retaining Walls

8.6.1 Foundations

The recommendations provided in the conventional foundation section of this report are also applicable to conventional retaining walls.

8.6.2 Lateral Earth Pressure

The following parameters are based on the use of low-expansion potential backfill materials within a 1:1 (H:V) line projected from the heel of the retaining wall.

The active earth pressure for the design of unrestrained earth retaining structures with level backfills can be taken as equivalent to the pressure of a fluid weighing 40 pcf. The at-rest earth pressure for the design of restrained earth retaining structures with level backfills can be taken as equivalent to the pressure of a fluid weighing 60 pcf. The above values assume a granular and drained backfill condition. Higher lateral earth pressures would apply if walls retain expansive clay soils. An additional 20 pcf should be added to these values for walls with a 2:1 (H:V) sloping backfill. An increase in earth pressure equivalent to an additional 2 feet of retained soil can be used to account for surcharge loads from light traffic. The above values do not include a factor of safety. Appropriate factors of safety should be incorporated into the design. Surcharge due to other loading within an approximate 1½:1 (H:V) projection from the back of the wall will increase the lateral pressures provided above and should be incorporated into the wall design.

Retaining walls should be designed to resist hydrostatic pressures or be provided with a back-drain to reduce the accumulation of hydrostatic pressures. Back-drains may consist of a two-foot wide zone of ¾-inch crushed rock. The back-drain should be separated from the adjacent soils using a non-woven filter fabric, such as Mirafi 140N or equivalent. Weep holes should be provided or a perforated pipe (Schedule 40 PVC) should be installed at the base of the back-drain and sloped to discharge to a suitable storm drain facility. As an alternative, a geo-composite drainage system such as Miradrain 6000 or equivalent placed behind the wall and connected to a suitable storm drain facility can be used. The project architect should provide waterproofing specifications and details.

8.6.3 Seismic Earth Pressure

Where required, seismic earth pressures can be taken as equivalent to the pressure of a fluid weighing 44 pounds per cubic foot (pcf) for flexible walls and 79 pcf for stiff walls. These values are for level backfill conditions and do not include a factor of safety. Sloping backfill will increase wall pressures. Appropriate factors of safety should be incorporated into the design.

The seismic pressure is in addition to the un-factored static active pressures. The allowable passive pressure and bearing capacity can be increased by ⅓ in determining the stability of the wall.

8.7 Interior Slabs-on-Grade

The project structural engineer should design the interior concrete slab-on-grade floor. We recommend that building slabs be at least 4-inches in thickness and that consideration be given to the slab being reinforced with No. 3 bars spaced 18-inches on center, each way, and placed at slab mid-height, or the slab reinforcement in accordance with the structural engineers design. Subgrade materials should not be allowed to desiccate between grading and the construction of the concrete slabs. The floor slab subgrade should be thoroughly and uniformly moistened prior to placing concrete.

A moisture vapor retarder/barrier should be placed beneath slabs where moisture sensitive floor coverings will be installed. Typically, plastic is used as a vapor retardant. If plastic is used, a minimum 10-mil is recommended. The plastic should comply with ASTM E1745. Plastic installation should comply with ASTM E1643.

Current construction practice typically includes placement of a 2-inch thick sand cushion between the bottom of the concrete slab and the moisture vapor retarder/barrier. This cushion can provide some protection to the vapor retarder/barrier during construction and may assist in reducing the potential for edge curling in the slab during curing. However, the sand layer also provides a source of moisture vapor

to the underside of the slab that can increase the time required to reduce moisture vapor emissions to limits acceptable for the type of floor covering placed on top of the slab. The slab can be placed directly on the vapor retarder/barrier. The floor covering manufacturer should be contacted to determine the volume of moisture vapor allowable and any treatment needed to reduce moisture vapor emissions to acceptable limits for the particular type of floor covering installed. The project team should determine the appropriate treatment for the specific application.

8.8 Exterior Slabs-on-Grade (Hardscape)

The top 24-inches of soil below exterior concrete slabs-on-grade should have an expansion index of 50 or less. Exterior slabs should have a minimum thickness of 4-inches and consideration given to be reinforced with at least No. 3 bars at 24-inches on center each way. Slabs should be provided with weakened plane joints. Joints should be placed in accordance with the American Concrete Institute (ACI) guidelines. Proper control joints should be provided to reduce the potential for damage resulting from shrinkage. Subgrade materials should not be allowed to desiccate between grading and the construction of the concrete slabs. The floor slab subgrade should be thoroughly and uniformly moistened prior to placing concrete.

All dedicated exterior flatwork should conform to standards provided by the governing agency including section composition, supporting material thickness and any requirements for reinforcing steel. Concrete mix proportions and construction techniques, including the addition of water and improper curing, can adversely affect the finished quality of the concrete and result in cracking and spalling of the slab. We recommend that all placement and curing be performed in accordance with procedures outlined by the American Concrete Institute and/or Portland Cement Association. Special consideration should be given to concrete placed and cured during hot or cold weather conditions.

8.9 Corrosivity

One sample of the onsite soils was tested to provide a preliminary indication of the corrosion potential of the onsite soils. The test results are presented in **Appendix B**. A brief discussion of the corrosion test results is provided in the following section.

- The sample tested had a soluble sulfate concentration of 0.025 percent, which indicates the sample has a negligible sulfate corrosion potential relative to concrete.

- It should be noted that soluble sulfate in the irrigation water supply, and/or the use of fertilizer may cause the sulfate content in the surficial soils to increase with time. This may result in a higher sulfate exposure than that indicated by the test results reported herein. Studies have shown that the use of improved cements in the concrete, and a low water-cement ratio will improve the resistance of the concrete to sulfate exposure.

- The sample tested had a chloride concentration of 0.026 percent, which indicates the sample has a negligible chloride corrosion potential relative to metal.

- The sample tested had a minimum resistivity of 520 ohm-cm, which indicates the sample is extremely corrosive to ferrous metals.

- The sample tested had a pH of 7.0, which indicates the sample is neutral.

Additional testing should be performed after grading to evaluate the as-graded corrosion potential of the onsite soils. We are not corrosion engineers. A corrosion consultant should be retained to provide corrosion control recommendations if deemed necessary.

9.0 PRELIMINARY PAVEMENT DESIGN RECOMMENDATIONS

Deleterious material, excessively wet or dry pockets, concentrated zones of oversized rock fragments, and any other unsuitable yielding materials encountered during grading should be removed. Once compacted fill and/or native soils are brought to the proposed pavement subgrade elevations, the subgrade should be proof-rolled in order to check for a uniform firm and unyielding surface. Representatives of the project Geotechnical Engineer should observe all grading and fill placement.

The upper 12-inches of pavement subgrade soils should be scarified; moisture conditioned to at least optimum moisture content and compacted to at least 95 percent of the laboratory standard (ASTM D1557). If loose or yielding materials are encountered during subgrade preparation, evaluation should be performed by EEI. Aggregate base materials should be properly prepared (i.e., processed and moisture conditioned) and compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557. Aggregate base materials should conform to Caltrans specifications for Class 2 aggregate base.

All pavement section changes should be properly transitioned. Although not anticipated, if adverse conditions are encountered during the preparation of subgrade materials, special construction methods may need to be employed. A representative of the project Geotechnical Engineer should be present for the preparation of subgrade and aggregate base.

For design purposes we have assumed a Traffic Index (TI) of 5.0 for the drive areas and entrance aprons at the subject property. This assumed TI should be verified as necessary by the Civil Engineer or Traffic Engineer. Based on the results of R-Value testing of the upper materials at the property, we have assumed a preliminary R-Value of 9 for the materials likely to be present at rough grades. The modulus of subgrade reaction (K-Value) was estimated at 70 pounds per square inch per inch (psi/in) for an R-Value of 9 (Caltrans, 1974). Pavement design was calculated for the parking lot structural section requirements for asphaltic concrete in accordance with the guidelines presented in the Caltrans Highway Design Manual. Rigid pavement sections were evaluated in general accordance with ACI 330R-08, based on an average daily truck traffic value of 10.

TABLE 3
Pavement Design Recommendations- Non-Permeable Flexible and Rigid Pavement

Traffic Index (TI) and Location	Pavement Surface	Aggregate Base Material (1)
5.0 – Main Drive Area	3-inches Asphalt Concrete	9-inches
4.5- Parking and Drive Areas	3-inches Asphalt Concrete	8-inches
Concrete Pavement - Parking Areas	5.0-inches Portland Cement Concrete (2)	4.0-inches
Concrete Pavement –Drive areas	6-inches Portland Cement Concrete (2)	6.0-inches
Concrete Pavement- Drive Approach/Heavy Truck- Trash Truck Pads/Trash Enclosure	7.0-inches Portland Cement Concrete (2)	6.0-inches

(1) R-Value of 78 for Caltrans Class II aggregate base
(2) Reinforcement and control joints placed in accordance with the pavement or structural engineer's requirements

The recommended pavement sections provided in **Table 3** are intended as a minimum guideline. If thinner or highly variable pavement sections are constructed, increased maintenance and repair could be expected. If the actual ADT (average daily traffic), ADTT (average daily truck traffic), or traffic index (TI) increases beyond our assumed values, increased maintenance and repair could be required for the pavement section. Final pavement design should be verified by testing of soils exposed at subgrade after grading has been completed. Thicker pavement sections could result if R-Value testing indicates lower values.

10.0 DEVELOPMENT RECOMMENDATIONS

10.1 Landscape Maintenance and Planting

Water is known to decrease the physical strength of earth materials, significantly reducing stability by high moisture conditions. Surface drainage away from foundations and graded slopes should be maintained. Only the volume and frequency of irrigation necessary to sustain plant life should be applied.

Consideration should be given to selecting lightweight, deep rooted types of landscape vegetation which require low irrigation that are capable of surviving the local climate. From a soils engineering viewpoint, "leaching" of the onsite soils is not recommended for establishing landscaping. If landscape soils are processed for the addition of amendments, the processed soils should be re-compacted to at least 90 percent relative compaction (based on ASTM D1557).

10.2 Site Drainage

Positive site drainage should be maintained at all times. Drainage should not flow uncontrolled over slopes. Runoff should be channeled away from slopes and structures and not allowed to pond and/or seep uncontrolled into the ground. Pad drainage should be directed toward an acceptable outlet. Consideration should be given to eliminating open bottom planters directly adjacent to proposed structures for a minimum distance of 10 feet. As an alternative, closed-bottom type planters could be utilized, with a properly designed drain outlet placed in the bottom of the planter.

Final surface grades around structures should be designed to collect and direct surface water away from structures and toward appropriate drainage facilities. The ground around the structure should be graded so that surface water flows rapidly away from the structure without ponding. In general, we recommend that the ground adjacent to the structure slope away at a gradient of at least 2 percent. Densely vegetated areas where runoff can be impaired should have a minimum gradient of at least 5 percent within the first 5 feet from the structure. Roof gutters with downspouts that discharge directly into a closed drainage system are recommended on structures. Drainage patterns established at the time of fine grading should be maintained throughout the life of the proposed structures.

10.3 Site Runoff Considerations - Stormwater Disposal Systems

It is our understanding that the Client is considering that runoff generated from the facility to be disposed of in engineered subsurface features onsite. We performed percolation testing in order to provide an indication of the infiltration characteristics of the onsite materials. Our testing and findings are summarized in the following sections.

10.3.1 Percolation Testing

Two percolation tests were performed onsite: B-1/P-1 and B-4/P-2 were performed during the subsurface exploration on October 9, 2018, at the location of the proposed detention basin in the western part of the property. Following the drilling of exploratory borings B-1/P-1 and B-4/P-2, a 3-inch diameter perforated polyvinyl chloride (PVC) pipe was placed in the hole and gravel was placed around the pipe. The test holes were presoaked in general accordance with the City of Oceanside BMP guidelines (City of Oceanside, 2016).

Percolation testing was performed until consistent results were obtained. The results were used to calculate the pre-adjusted percolation rate for the test hole. Upon conclusion of testing, the perforated pipe was removed from the test hole and the test hole was backfilled.

We note that a soil profile's percolation rate is not the same as its infiltration rate. Therefore, the measured/calculated field percolation rate was converted to an estimated infiltration rate utilizing a reduction factor determined using the Porchet method. Additionally, as indicated in the County of San Diego BMP guidelines (County of San Diego, 2016) and City of Oceanside BMP

Guidelines (2016), a feasibility factor of safety of 2.0 is should be applied to the measured infiltration rates to account for remaining uncertainty and long-term deterioration that cannot be technically mitigated. The following **Table 4** presents the measured percolation rates and corresponding infiltration rates calculated for test holes B-1/P-1 and B-4/P-2.

TABLE 4
Summary of Percolation Testing

Location	Depth (ft.)	Pre-Adjusted Percolation Rate (in/hr)	Infiltration Rate* (in/hr)
B-1/P-1	~ 15	4.80	0.21/0.11*
B-4/P-2	~ 9	2.40	0.22/0.11*

*Feasibility factor of safety of 2.0 is included

10.3.2 Summary of Findings

The County of San Diego/Oceanside BMP guidelines indicate that onsite storm-water disposal systems can be designed for "Full-Infiltration" for subsurface materials with corrected infiltration rates equal to or greater than 0.5-inches per hour, and for "Partial Infiltration" for corrected infiltration rates less than 0.5-inches per hour. With the 2.0 factor of safety applied the estimated infiltration rate from both B-1/P-1 and B-4/P-2 are less than 0.5-inches per hour. It is our conclusion that the on-site soils in the areas tested appear unsuitable for direct storm water full infiltration per the City of Oceanside/ County of San Diego's BMP guidelines.

We provide the following conclusions regarding the percolation test results:

- It is our opinion that the percolation characteristics at the tested depths and locations are generally representative of the site conditions in the vicinity of the test holes. Percolation testing was performed within decomposed granitic bedrock materials.

- As discussed in the County of San Diego/Oceanside BMP guidelines for percolation testing, the bottom of the borings where the percolation tests are performed should be at approximately the same depth of the invert of the proposed infiltration facility. The project civil engineer should determine if the tests performed meet this requirement.

- As discussed in the County of San Diego/Oceanside BMP guidelines, a correction factor should be applied to the measured infiltration rates to account for soil assessment method, soil type, soil variability, depth to groundwater, level of pretreatment, redundancy, and compaction during construction. The project civil engineer should determine the appropriate design-level factor of safety for the proposed disposal system.

Design of the stormwater disposal system should be in accordance with the City of Oceanside BMP Guidelines/County of San Diego guidelines. The completed form I-8 of the San Diego Region Model BMP Design Manual is included as **Appendix D**.

10.3.3 Structure Setback from Retention Devices

We recommend that storm-water disposal systems be situated at least three times their depth, or a minimum of 15 feet (whichever is greater), from the outside bottom edge of structural foundations. Structural foundations include (but are not limited to) buildings, loading docks, retaining walls, and screen walls. The invert of storm-water infiltration should be outside a 1:1 (H:V) plane projected from the bottom of adjacent foundations.

Stormwater disposal systems should be checked and maintained on regular intervals. Stormwater devices including bio-swales that are located closer than 10 feet from any foundations/footings should be lined with an impermeable membrane to reduce the potential for saturation of foundation soils. Foundations may also need to be deepened.

Storm water infiltration should not be located near utility lines where the introduction of storm water could cause damage to utilities or settlement of trench backfill.

10.4 Additional Site Improvements

Recommendations for additional grading can be provided upon request. If in the future, additional property improvements are planned for the subject property, recommendations concerning the design and construction of improvements would be provided upon request.

10.5 Utility Trench Backfill

Fill around the pipe should be placed in accordance with details shown on the drawings and should be placed in layers not to exceed 8-inches loose (unless otherwise approved by the geotechnical engineer) and compacted to at least 90 percent of the maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor). The geotechnical engineer should approve all backfill material. Select material should be used when called for on the drawings, or when recommended by the geotechnical engineer. Care should be taken during backfill and compaction operations to maintain alignment and prevent damage to the joints. The backfill should be kept free from oversized material, chunks of highly plastic clay, or other unsuitable or deleterious material. Backfill soils should be non-expansive, non-corrosive, and compatible with native earth materials. Backfill materials and testing should be in accordance with the CBC (2016), and the requirements of the local governing jurisdiction.

Pipe backfill areas should be graded and maintained in such a condition that erosion or saturation will not damage the pipe bedding or backfill. Flooding trench backfill is not recommended. Heavy equipment should not be operated over any pipe until it has been properly backfilled with a minimum of 2 to 3 feet of cover. The utility trench should be systematically backfilled to allow maximum time for natural settlement. Backfill should not occur over porous, wet, or spongy subgrade surfaces. Should these conditions exist, the areas should be removed, replaced and recompacted.

11.0 PLAN REVIEW

Once detailed grading and foundation plans are available, they should be submitted to EEI for review and comment, to reduce the potential for discrepancies between plans and recommendations presented herein. If conditions found differ substantially from those stated; appropriate recommendations will be provided. Additional field studies may be warranted.

12.0 LIMITATIONS

This Geotechnical Evaluation has been conducted in accordance with generally accepted geotechnical engineering principles and practices. Findings provided herein have been derived in accordance with current standards of practice, and no warranty is expressed or implied. Standards of practice are subject to change with time. This report has been prepared for the sole use of Protea Senior Living Oceanside, LLC (Client), within a reasonable time from its authorization.

Subject property conditions, land use (both onsite and offsite), or other factors may change as a result of manmade influences, and additional work may be required with the passage of time. This Geotechnical Evaluation should not be relied upon by other parties without the express written consent of EEI and the Client; therefore, any use or reliance upon this Geotechnical Evaluation by a party other than the Client should be solely at the risk of such third party and without legal recourse against EEI, its employees, officers, or directors, regardless of whether the action in which recovery of damages is brought or based upon contract, tort, statue, or otherwise. The Client has the responsibility to see that all parties to the project, including the designer, contractor, subcontractor, and building official, etc. are aware of this report in its complete form. This report contains information that may be used in the preparation of contract specifications; however, the report is not designed as a specification document, and may not contain sufficient information for use without additional assessment. EEI assumes no responsibility or liability for work or testing performed by others. In addition, this report may be subject to review by the controlling authorities.

13.0 REFERENCES

American Society of Civil Engineers (ASCE), 2010, Minimum Design Loads for Buildings and Other Structures, ASCE Document ASCE/SEI 7-10.

American Society for Testing and Materials (ASTM), 2015, Annual Book of ASTM Standards, Volume 04.08, Construction: Soil and Rock (I), Standards D 420 - D 5876.

California Building Code (CBC), 2016, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, California Building Standards Commission, Based on 2015 International Building Code; 2016 California Historical Building Code, Title 24, Part 8; and 2013 California Existing Building Code, Title 24, Part 10, effective January 1, 2017.

California Department of Transportation (Caltrans), 1974, Highway Design Manual, dated October 1, 1974.

California Division of Mines and Geology (CDMG), 2000, California Department of Conservation, Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region, DMG CD 2000-003.

California Geological Survey (CGS), 2002, California Geomorphic Provinces Note 36, Electronic Copy, Revised December 2002.

California Geological Survey (CGS), 2009, Tsunami Inundation Map for Emergency Planning: San Luis Rey Quadrangle, California Geological Survey and University of Southern California, dated June 1, 2009, scale 1:24,000.

City of Oceanside, 2016, Oceanside BMP Design Manual, Oceanside Department of Public Works, dated February 2016.

County of San Diego, 2016, Model Best Management Practices (BMP) Design Manual, San Diego Region, For Permanent Site Design, Storm Water Treatment and Hydromodification Management, dated February 2016.

Federal Emergency Management Agency (FEMA), 2012, Flood Insurance Rate Map 06073C0767G, San Diego County, California, dated May 16, 2012.

Google Earth®, 2018, Version 7.1.5.1557.

Hart, E.W., and Bryant, W.A. (Hart and Bryant), 1997, Fault-Rupture Hazard Zones in California: California Department of Conservation, Division of Mines and Geology, Special Publication 42.

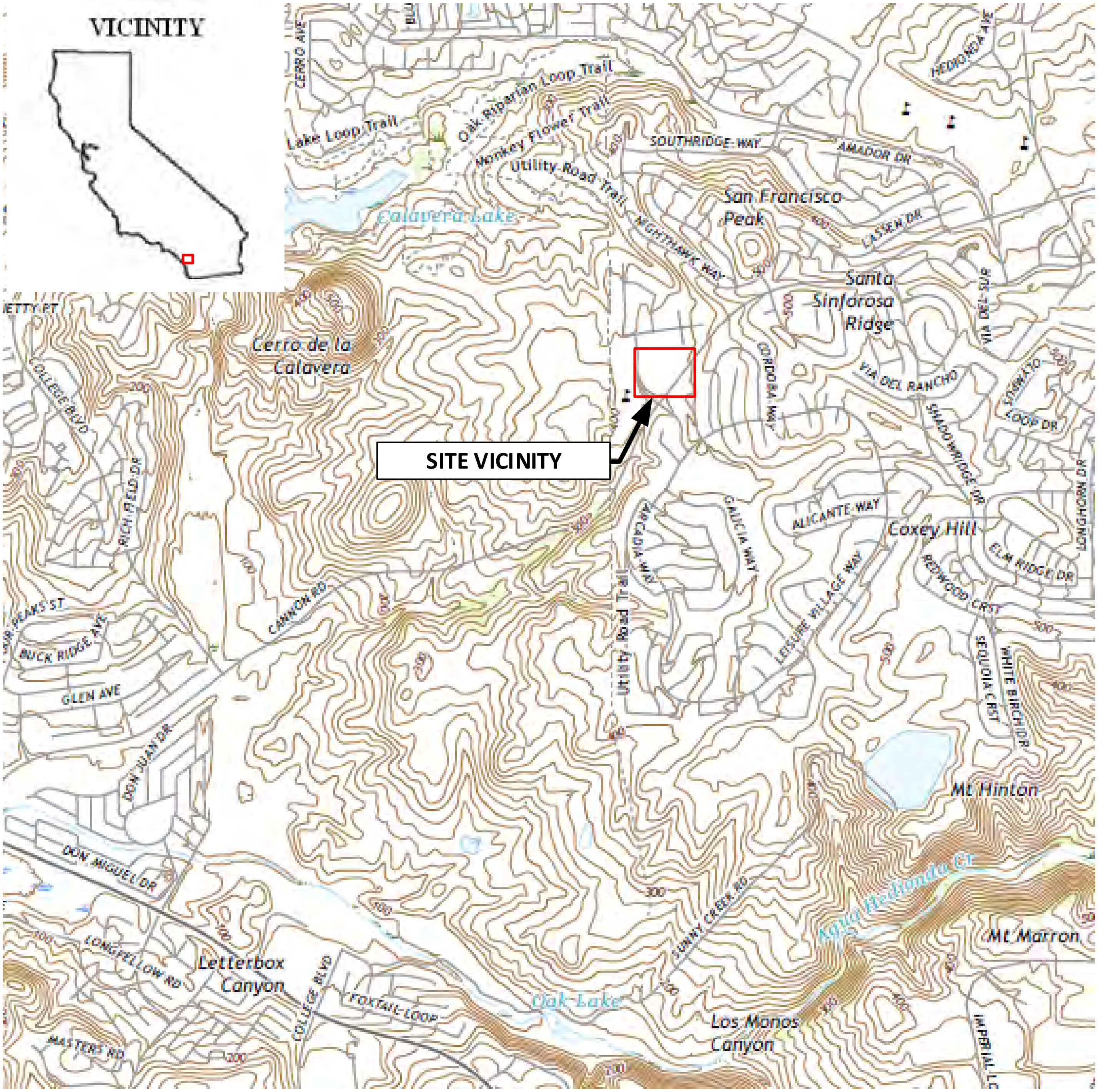
Jennings, C.W., and Bryant, W.A., (Jennings and Bryant) 2010, Fault Activity Map of California and Adjacent Areas: California Geologic Survey, Map Sheet No. 6, scale 1:750,000.

Kennedy, M.P., and S.S. Tan, 2007, Geologic Map of the Oceanside 30' x 60' Quadrangle, California, California Geological Survey, Regional Geologic Map Series No. 2, scale 1:100,000.

United States Geological Survey (USGS), 2018, 7.5 Minute Topographic Map, San Luis Rey, California Quadrangle, scale 1:24,000.

United States Geological Survey (USGS), 2008, 2008 National Seismic Hazard Maps – Online Fault Database Search, web address < http://earthquake.usgs.gov/hazards/products/conterminous/>, accessed June 2016.

FIGURES



Source: USGS San Luis Rey 7.5-minute quadrangle, 2018

LEGEND

N

Scale: 1" = 2000 feet

0 | 1000 ft | 2000 ft | 4000 ft

Note: All Locations Are Approximate

SITE VICINITY MAP

Protea Senior Living Oceanside, LLC
Ocean Hills Phase II Development
4500 Cannon Rd.
Oceanside, CA
EEI Project No. AAA-72646.4
Created October 2018

EEI Engineering Solutions

FIGURE 1

N

Scale: 1" = 400'

0 200 ft 400 ft 240 ft

Note: All Locations Are Approximate

AERIAL SITE MAP

Protea Senior Living Oceanside, LLC

Ocean Hills Phase II Development

4500 Cannon Rd.

Oceanside, CA

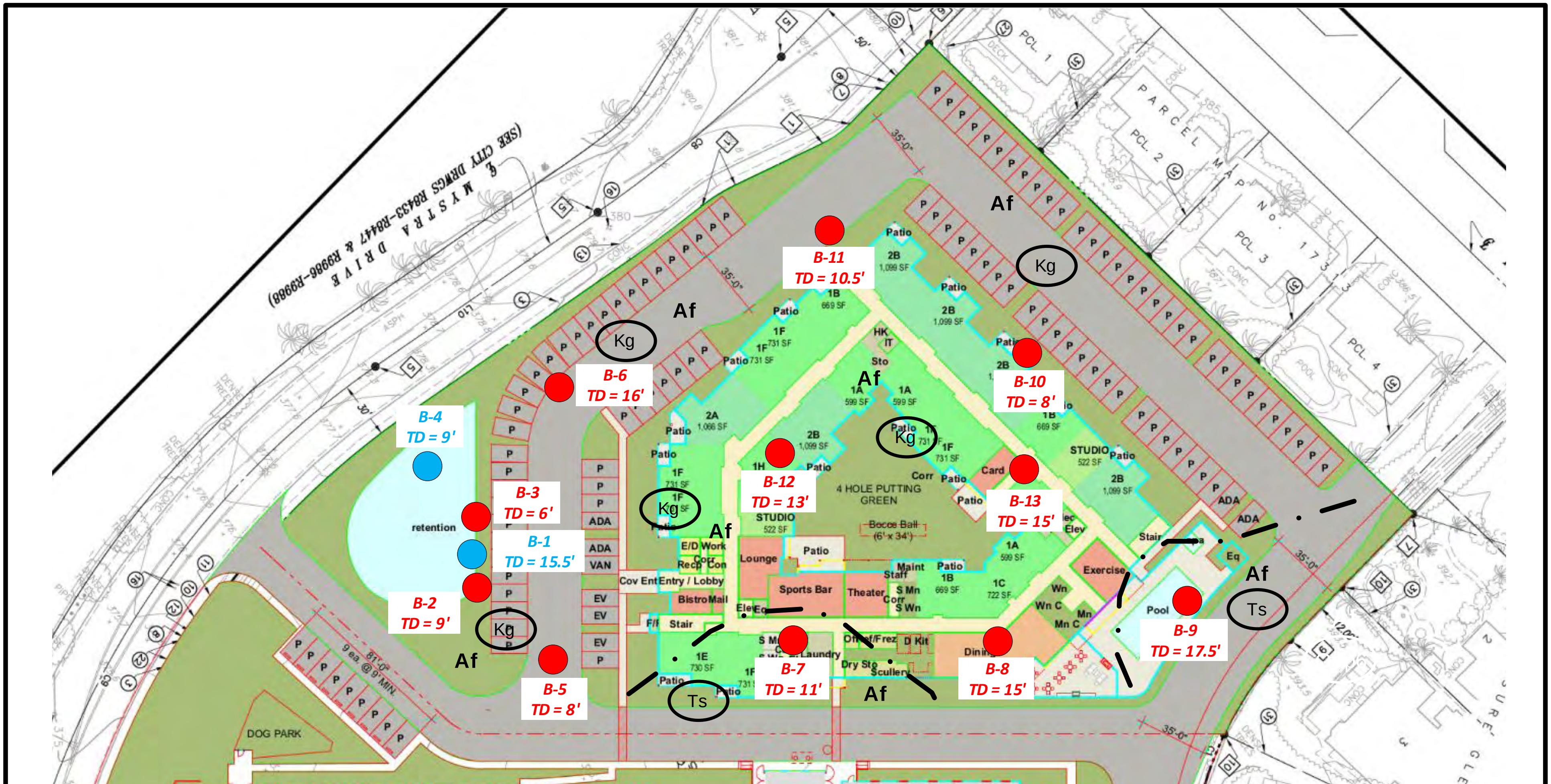
EEI Project No. AAA-72646.4

Created October 2018

EEI Engineering Solutions

FIGURE 2

Source: Google Earth, 2018



Source: Irwin Partners Architects, Site Plan, 2018

LEGEND

B-2 ●	*Approximate Boring Locations with Total Depth (TD)*
B-1 ●	*Approximate Boring/Percolation Test Location with Total Depth (TD)*
Af	*Undocumented Artificial Fill*
Ts	*Approximate Location of Eocene Santiago Formation; Circled where buried*
Kg	*Approximate Location of Cretaceous Granitics; Circled where buried*
— · —	*Approximate Subsurface Geologic Contact*

0 FT 80 FT 160 FT

Note: All Locations Are Approximate

N

Scale: 1" = 80'

GEOTECHNICAL MAP

Protea Senior Living Oceanside, LLC

Ocean Hills Phase II Development

4500 Cannon Rd.

Oceanside, CA

EEI Project No. AAA-72646.4

Created October 2018

EEI Engineering Solutions

FIGURE 3

APPENDIX A
SOIL CLASSIFICATION CHART AND BORING LOGS

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-98)

MAJOR DIVISIONS			SYMBOLS: GRAPH	SYMBOLS: LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS GREATER THAN 50% OF COARSE FRACTION PASSING NO. 4 SEIVE	CLEAN GRAVELS (LESS THAN 5% PASSING #200 Sieve)		GW	WELL-GRADED GRAVELS, GRAVEL- SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH FINES (GREATER THAN 12% PASSING #200 Sieve)		GM	SILTY-GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY-GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS GREATER THAN 50% OF COARSE FRACTION PASSING NO. 4 SEIVE	CLEAN SANDS (LESS THAN 5% PASSING #200 Sieve)		SW	WELL-GRADED SANDS,GRAVELLY-SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY-SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (GREATER THAN 12% PASSING #200 Sieve)		SM	SILTY-SANDS
				SC	CLAYEY-SANDS
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	Low Plasticity (LIQUID LIMIT LESS THAN 50)		ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC CLAYS WITH LOW PLASTICITY
	SILTS AND CLAYS	High Plasticity (LIQUID LIMIT GREATER THAN 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR VOCANIC ASH
				CH	INORGANIC CLAYS WITH HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS

SAMPLER TYPES

SPT

Modified California (2.5" I.D.)

Bulk

Rock Core

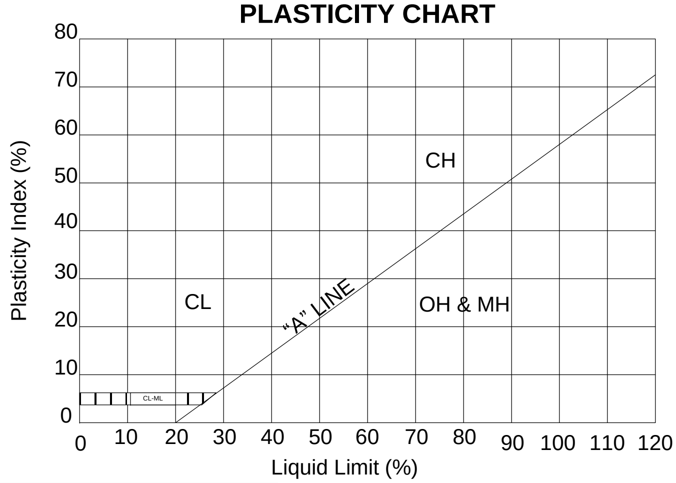
Shelby Tube

Water Level

OTHER TESTS

ATT – Atterberg Limit (Plasticity Index)
CD – Consolidated Drained Triaxial
CON – Consolidation
COR – Corrosivity
DS – Direct Shear
EI – Expansion Index
MAX – Maximum Density
RV – R-Value
SA – Sieve Analysis
-#200 - Percent Passing #200 Sieve
TV – Torvane Shear
UU – Unconsolidated Undrained Triaxial

PLASTICITY CHART



PENETRATION RESISTANCE
(Recorded As Blows/Foot)

SAND & GRAVEL		SILT & CLAY		
Relative Density	Blows/Foot* N_{60}	Consistency	Blows/Foot* N_{60}	Strength**(KSF)
Very Loose	0-4	Very Soft	0 - 2	0 – 0.5
Loose	4-10	Soft	2 - 4	0.5 – 1.0
Medium Dense	10-30	Medium Stiff	4 - 8	1.0 – 2.0
Dense	30-50	Stiff	8 - 15	2.0 – 4.0
Very Dense	Over 50	Very Stiff	15 - 30	4.0 – 8.0
		Hard	Over 30	Over 8.0

* Number of blows of 140LB hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split barrel sampler the last 12 inches of an 18-inch drive (ASTM-1586 Standard Penetration Test)

** Undrained shear strength in kips/sq. ft. As determined by laboratory testing or approximated by the standard penetration test, pocket penetrometer, torvane, or visual observation

EEI
Geotechnical & Environmental Solutions

LEGEND TO SOIL DESCRIPTIONS

APPENDIX A

BORING NUMBER B-1/P-1

EEI Engineering Solutions

CLIENT	Protea Senior Living Oceanside, LLC	**PROJECT NAME**	Ocean Hills Phase 2
PROJECT NUMBER	AAA-72646.4	**PROJECT LOCATION**	4500 Cannon Road, Oceanside CA
DATE STARTED	10/9/18	**COMPLETED**	10/9/18
GROUND ELEVATION	386 feet	**BORING DIAMETER**	8"
EQUIPMENT / RIG	Truck Mounted CME-55	**HAMMER EFFICIENCY (%)**	60
METHOD	8" Hollow Stem Auger 140 lbs Auto Hammer	**SPT CORRECTION**	1.00
CAL CORRECTION	0.55		
LOGGED BY	MC	**CHECKED BY**	JPB
GROUNDWATER DEPTH (ft)	Not Encountered		
NOTES			

DEPTH (ft)	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0	**ARTIFICIAL FILL (Af)** Sandy Gravelly CLAY and Clayey SAND, light reddish-brown, damp, very dense/very stiff	SC	BULK								
2.5			MC	50 for 5"			12	101			
5			MC	50 for 3"			6	95			
6	**BEDROCK** @ 6' Decomposed GRANITE (Kg), excavates to Clayey SAND, reddish-brown mottled, oxidized, damp, very dense	SC									
7.5			MC	50 for 5"			5	129			
10	@ 10' No recovery		NR	50 for 2"							
15	@ 15' No recovery; refusal		NR	50 for 2"							

Total depth due to refusal: 15.1'
No groundwater encountered
Percolation test performed
Backfilled with bentonite and native soil

BORING NUMBER B-2

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 386 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–4		**ARTIFICIAL FILL (Af)** Clayey SAND, tan, medium dense, damp	SC									
4–9		**BEDROCK** @ 4' Decomposed GRANITE (Kg), excavates to Sandy CLAY to Clayey SAND, reddish brown, oxidized, damp, dense @ 9' Refusal	SC-CL									

Total depth: 9'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-3

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 386 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0 1 2 3		**ARTIFICIAL FILL (Af)** Clayey SAND, tan, medium dense, damp	SC-SM									
4 5 6		**BEDROCK** @ 4' Decomposed GRANITE (Kg), excavates to Sandy CLAY, reddish brown, oxidized, damp, very stiff @ 6' Refusal	CL									

Total depth: 6'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-4/P-2

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 386 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–4.5		**ARTIFICIAL FILL (Af)** Silty SAND, tan to light brown, damp, dense, common <2" gravel, trace clay	SM									
4.5–9		**BEDROCK** @ 4.5' Decomposed GRANITE (Kg), excavates to Silty Clayey SAND, reddish brown, oxidized, damp, very dense	SC									
9		@ 9' Refusal		SPT	50 for 2"			14				

Total depth due to refusal: 9'
Percolation test performed
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-5

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 387 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0		**ARTIFICIAL FILL (Af)** GRAVEL, damp, dense, temporary road	GP									
1		@ 0.5' Silty Gravelly SAND, reddish brown, damp, very dense	SM									
3				BULK MC	40 50 for 2"			7	122			
4		**BEDROCK** @ 4' Decomposed GRANITE (Kg), excavates to Clayey SAND and Sandy CLAY, reddish-brown mottled, oxidized, damp, very dense	SC									
5				MC	50 for 5"			8	114			
7.5		@ 7.5' No Recovery		NR	50 for 1"							
8		@ 8' Refusal										

Total depth due to refusal: 8'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-6

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 386 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0		**ARTIFICIAL FILL (Af)** Silty SAND, tan to reddish brown, damp, medium dense	SM	BULK								
3				MC	15 20 26	25		17	108			
5		@ 5' Sandy GRAVEL, reddish brown, damp, dense, common <1" dacite and granitic fragments	GM	MC	43 23 34	31		11	110			
7		**ALLUVIUM (Qal)** @ 7' Sandy SILT, dark brown to black, damp, stiff, trace clay, common roots, trace gravel	ML	MC	17 20 36	31		17	113			
9		**BEDROCK** @ 9' Decomposed GRANITICS (Kg), excavates to Clayey SAND, reddish brown, oxidized, damp, very dense	SC	MC	24 17 33	28		10	130			
15		@ 16' Refusal		SPT	50 for 3"			7				
16												

Total depth due to refusal: 16'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-7

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 388 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–6		**ARTIFICIAL FILL (Af)** Silty SAND, tan to reddish brown, damp, medium dense, trace gravel	SM	MC	6 17 32	27		18	107			
				MC	13 50 for 2"			22	99			
6–9.5		@ 6' Sandy CLAY, reddish brown, damp, very stiff, common <1" dacite and granitic fragments	SC	MC	50 for 2"			17	131			
								13				
9.5–11		**SANTIAGO FORMATION (Ts)** @ 9.5' excavates to Clayey SAND to Silty SAND, reddish brown, oxidized, damp, very dense/stiff @ 11' Refusal on possible granitic rock	CL-ML	SPT	23 18 19	37						

Total depth due to refusal: 11'
No groundwater encountered
Backfilled with bentonite and native soil

GEOTECH LOG - COLUMNS AAA-72646.4.GPJ GINT STD US LAB.GDT 10/26/18

EEI

BORING NUMBER B-8

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 390 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–5	**ARTIFICIAL FILL (Af)** Silty SAND, tan to reddish brown, damp, medium dense, trace gravel, trace clay	SM	BULK; MC	8 12 19	17		12	118			
5–7	@ 5' Gravelly SAND, reddish brown, damp, dense, common <1" dacite and granitic fragments, trace clay	GM	MC	15 17 18	19		5	120			
7–10	@ 7' Gravelly Silty CLAY, olive to reddish brown, damp, stiff to very stiff	GC	MC	13 18 20	21		15	116			
10–15	**BEDROCK** @ 10' Decomposed GRANITICS (Kg), excavates to Clayey SAND, reddish brown, oxidized, damp, very dense	SC	MC	50 for 4"			8	103			
14–15	@ 15' Refusal		SPT	39 32 23	55		7				

Total depth due to refusal: 15'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-9

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 390 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–2		**ARTIFICIAL FILL (Af)** Silty SAND, tan to reddish brown, damp, medium dense, trace gravel, trace clay	SM	BULK (0–5)								
2–7		@ 2' Sandy Clayey SILT to Silty CLAY, damp stiff, common <1" dacite and granitic fragments, trace sand	CL-ML									
2.5–4				MC	9 13 21	19		18	106			
5–6.5				MC	13 17 22	21		15	116			
7–11		@ 7' Silty SAND, tan to reddish brown, damp, very dense, trace clay	SM									
7.5–8.5				MC	50 for 12"			8	121			
10		@ 10' No recovery; gravel?		NR	50 for 4"							
11–13		**ALLUVIUM** @ 11' Clayey SAND, reddish brown to grayish-brown, damp, very dense, common <2" granitic and siltstone fragments	SC									
13–17.5		**SANTIAGO FORMATION (Ts)** @ 13' excavates to CLAY, olive to reddish brown, oxidized, damp, stiff to very stiff, trace gypsum	CL					20				
15–16.5				SPT	5 8 12	20						
17.5		@ 17.5' Refusal on possible granitic rock										

Total depth due to refusal: 17.5'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-10

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 391 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–2		**ARTIFICIAL FILL** Silty Gravelly SAND, light brown, medium dense, damp, trace clay, common <1" gravel	SM									
2–6		@ 2' Silty SAND, tan white mottled, damp, dense	SM	MC	16 35 45	44		12	119			
				MC	12 25 35	33		20	117			
6–8		@ 6' Silty CLAY, tan to olive brown to brown, some orange oxidation streaks, slightly moist, very stiff, common <2" sandstone and granitic fragments	CL-ML					14				
				SPT	41 21 23	44						
8		@ 8' Refusal on possible granitic rock										

Total depth due to refusal: 8'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-11

CLIENT Protea Senior Living Oceanside, LLC		**PROJECT NAME** Ocean Hills Phase 2	
PROJECT NUMBER AAA-72646.4		**PROJECT LOCATION** 4500 Cannon Road, Oceanside CA	
DATE STARTED 10/9/18	**COMPLETED** 10/9/18	**GROUND ELEVATION** 390 feet	**BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55		**HAMMER EFFICIENCY (%)** 60	
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer		**SPT CORRECTION** 1.00	**CAL CORRECTION** 0.55
LOGGED BY MC	**CHECKED BY** JPB	**GROUNDWATER DEPTH (ft)** Not Encountered	
NOTES			

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–1		**ARTIFICIAL FILL** Silty Gravelly SAND, light brown, damp, medium dense, common roots	SM									
1–4		@ 1' Clayey SILT, tan to brown to olive brown, slightly moist, very stiff, common <4" fragments of sandstone, granitics, and dacite	CL-ML	BULK MC	15 35 45	44		17	115			RV
4–7		@ 4' Silty Gravelly CLAY, brown to olive brown, slightly moist, very stiff, common <2" granitic, sandstone, and dacite fragments	GC	MC	6 25 30	30		18	108			
7–9		**ALLUVIUM** @ 7' Sandy SILT, dark reddish brown to black, damp, very dense, trace clay, common roots and artificial detritus	ML	MC	19 35 40	41		10	127			
9–10.5		**BEDROCK** @ 9' Decomposed GRANITE, excavates to Clayey SAND, reddish brown mottled, damp, very dense @ 10.5' Refusal	SC	MC	50 for 5"			6	141			

Total depth due to refusal: 10.5'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-12

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 388 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–5.5		**ARTIFICIAL FILL** Silty Gravelly SAND, light brown to tan, damp, medium dense, common roots, common <5" fragments of sandstone	SM	MC	21 34 46	44		12	115			
5.5				MC	10 30 50 for 3"			9	112			
5.5–10		@ 5.5' Sandy Gravelly CLAY, tan to grayish-brown to olive-brown, slightly moist, very stiff to hard, common <2" granitic, sandstone, and dacite fragments	GC	MC	50 for 6"			10	92			
10–13		**ALLUVIUM** @ 10' Sandy GRAVEL and Gravelly SAND, reddish brown to dark brown, damp, very dense, common <3" granitic and dacite fragments, trace clay	GM	MC	50 for 6"			10	109			
12				SPT	30 50 for 3"			10				
13		@ 13' Refusal; possible granitic contact										

Total depth due to refusal: 13'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-13

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 390 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–1.5		**ARTIFICIAL FILL** Silty Gravelly SAND, light brown to tan, damp, medium dense, common roots, common <5" fragments of sandstone	SM									
1.5–7		@ 1.5' Silty CLAY and Sandy SILT, olvie to white mottled to tan, very stiff, slightly moist	CL-ML	BULK MC	22 50 for 5"			16	114			EI DS COR MAX
				MC	15 29 36	36		27	101			
7–9.5		@ 7' Sandy SILT, tan to brown, damp, very stiff to hard	MLS	MC	50 for 4"			9	22			
9.5–13		**ALLUVIUM** @ 9.5' Clayey Silty SAND, black to dark brown, orange-red oxidation, damp, very dense, some plant roots, possible topsoil or alluvium	SC	MC	50 for 5"			11	93			
13–15		@ 13' Clayey SAND, reddish brown, very dense, damp, decomposed granite?	SC									
15		@ 15' No recovery; refusal on possible granitic rock		NR	50 for 2"							

Total depth due to refusal: 15.1'
No groundwater encountered
Backfilled with bentonite and native soil

APPENDIX B
LABORATORY TEST DATA

Laboratory tests were performed to provide geotechnical parameters for engineering analyses. The following tests were performed:

- **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System.
- **MOISTURE CONTENT and DRY DENSITY:** The in-situ moisture content and dry density of soils was determined for soil samples obtained from the borings, and were determined in general accordance with ASTM D2216 and ASTM 2937, respectively.
- **GRAIN SIZE DISTRIBUTION:** The grain size distribution was determined on select samples in accordance with ASTM D422.
- **ATTERBERG LIMITS**: The Atterberg limits were determined on select samples in accordance with ASTM D4318.
- **EXPANSION INDEX:** The expansion index was determined on select samples in accordance with ASTM D4829.
- **CORROSIVITY**: Corrosion testing of representative soil samples included sulfate potential by California Test 417, chloride potential by California Test 422, and soil minimum resistivity and pH by California Test 643. The sample was tested at the Clarkson Laboratory and Supply, Inc. located in Chula Vista, California.

EXPANSION INDEX TEST

ASTM METHOD D4829

B-13 @ 0-5 ft.

Moisture Content of Initial Sample		% Saturation of Re-molded Sample		Moisture Content of Final Sample	
Tare No. -	55	Wt. of Soil and Ring (g) -	610.2	Wt. of Soil and Ring (g) -	640.5
Wet Weight and Tare (g) -	161.5	Ring Weight (g) -	198.6	Ring Weight (g) -	198.6
Dry Weight and Tare (g) -	152.7	Wet Weight of Soil (g) -	411.6	Wet Weight of Soil (g) -	441.9
Tare Weight (g) -	50.1	Dry Weight of Soil (g) -	379.1	Dry Weight of Soil (g) -	379.1
Water Loss (g) -	8.8	Volume of Ring (ft^3) -	0.0073	Weight of Water (g) -	62.8
Dry Weight (g) -	102.6	Dry Density (pcf) -	114.5	Final Moisture (%)	16.6
Initial Moisture (%) -	8.6	Initital Saturation (%) -	49.1	Final Saturation (%) -	94.9

Expansion Test - UBC (144 PSF)				
	Date	Time	Reading	
Add Weight	10/18/18	10:40	0.000	
10 Minutes		10:50	0.000	Initial Reading
Add Water		11:40	0.040	
		1:12	0.041	
	10/19/18	5:50	0.043	Final Reading

EImeasured	=	43
EI_{50}	=	42

Expansion Index, EI_{50}	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

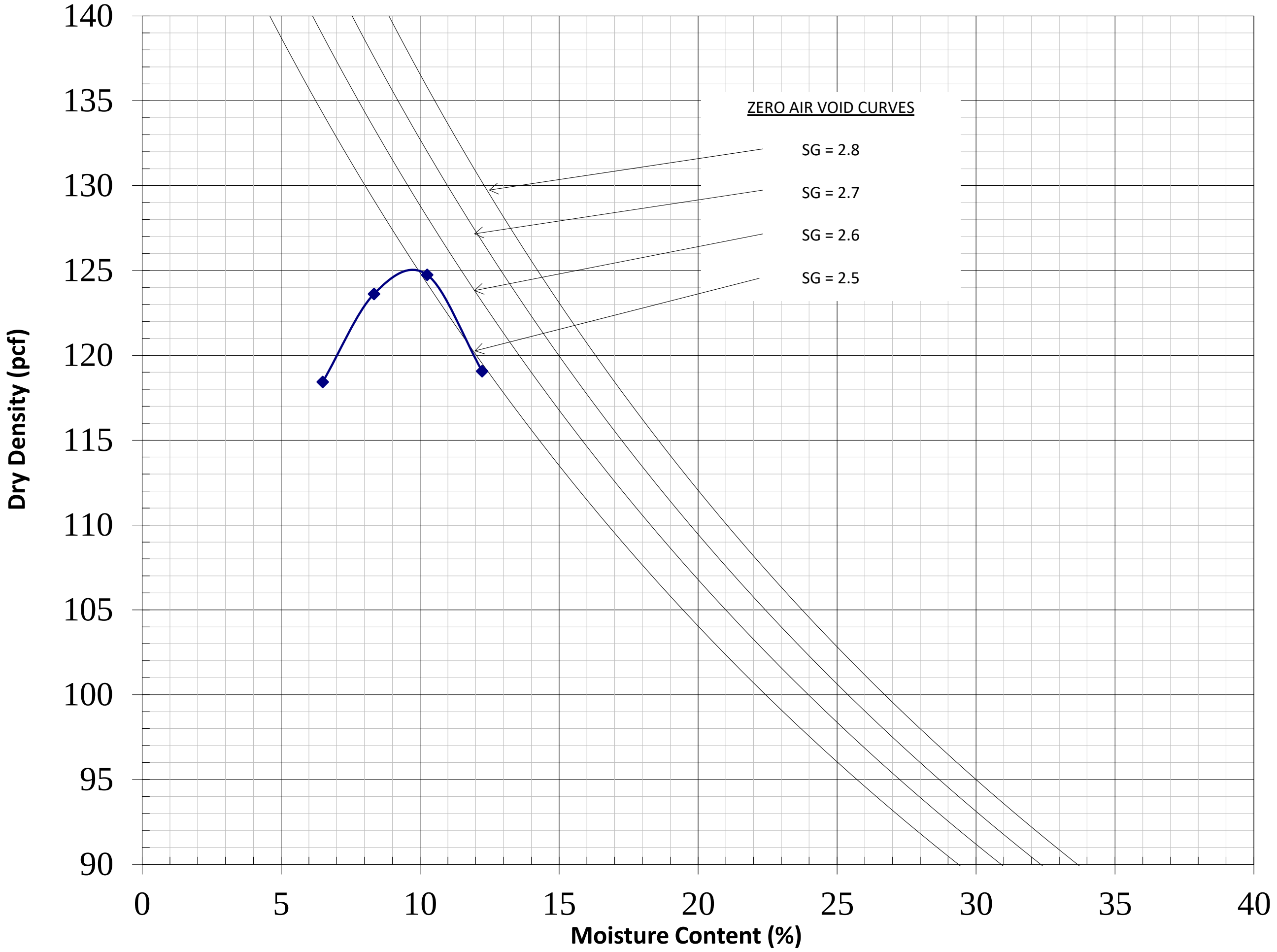
EEI
Engineering Solutions

2195 Faraday Avenue, Suite K, Carlsbad, CA 92008

Client:	Portola
Project Name:	Parcel #2
Project No.:	AAA-72646.4
Date:	10/18/2018
Boring/Sample No.:	B-13
Depth/Location:	0-5 ft.
Soil Description:	Grey-Brn. Sandy Silt SM
Tested By:	B D

LABORATORY COMPACTION ASTM D 1557

Sample	1	2	3	4
Mold and Wet Soil (lbs.)	8.48	8.74	8.86	8.73
Small Mold (lbs.)	4.28	4.28	4.28	4.28
Wet Soil (lbs.)	4.20	4.46	4.58	4.45
Wet Density (pcf)	126.1	133.9	137.5	133.6
Tare and Wet Soil (gm.)	100.00	100.00	100.00	100.00
Tare and Dry Soil (gm.)	93.90	92.30	90.70	89.10
Moisture (%)	**6.5**	**8.3**	**10.3**	**12.2**
Dry Density (pcf)	**118.4**	**123.6**	**124.7**	**119.1**



Maximum Density 125.5 pcf @ 9.5 % Moisture

EEI Engineering Solutions

2195 Faraday, Suite K, Carlsbad, CA 92008

Client:	Protea Senior Living-Oceanside,LLC
Project Name:	Parcel #2
Project Number:	AAA-72646.4
Date:	10/17/2018
Procedure:	D-1557-A
Boring/Sample No.:	B-13
Depth/Location:	0-5 ft.
Soil Description:	Brown Silty Sand SM
Tested By:	B D

DIRECT SHEAR TEST (ASTM D3080)

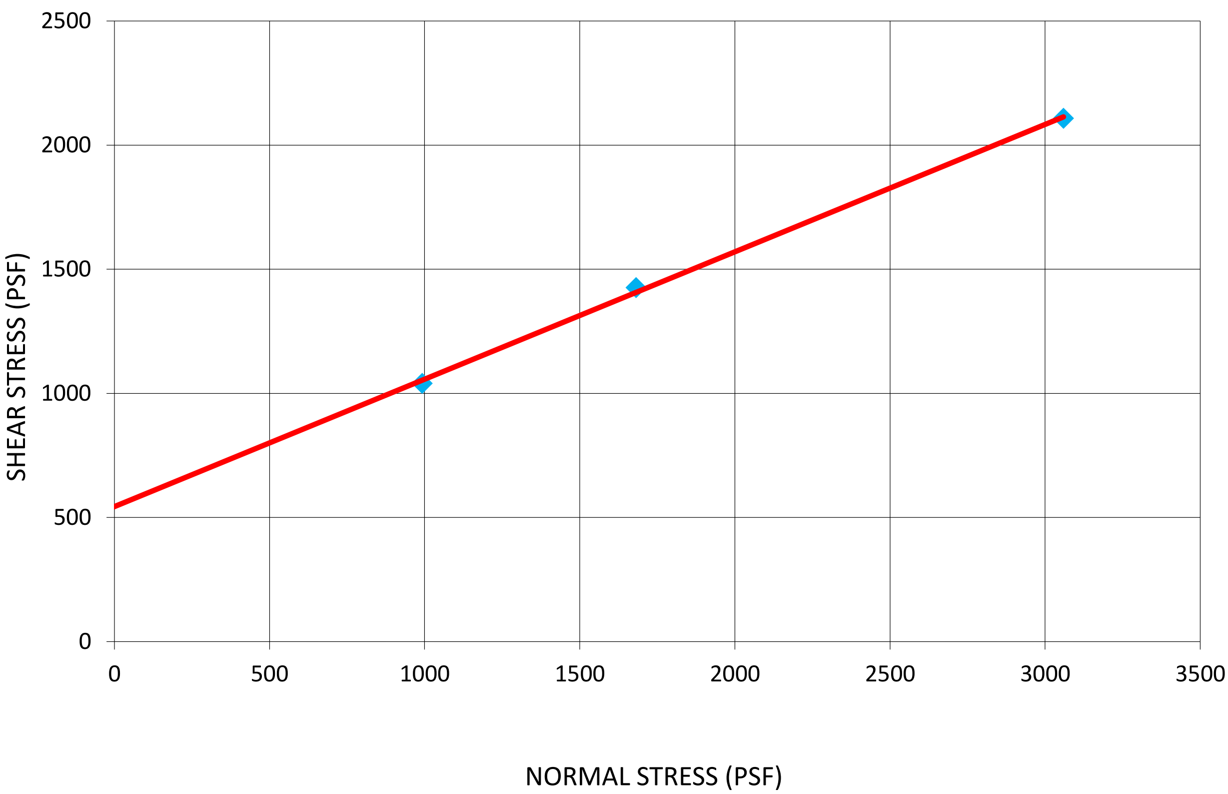
B-13	@	0-5 ft

Sample Data	
Remolded:	90%
Remarks:	Sample inundated prior to testing
Soil Description:	Grey-Brn. Sandy Silt ML

Test Results		
Average Initial Moisture =	9.5	%
Average Dry Density =	112.9	pcf
Average Final Moisture =	17.1	%

Peak Strength	ϕ = 27 deg.	c = 544 psf

SHEAR TEST DIAGRAM



Engineering Solutions

2195 Faraday Avenue, Suite K, Carlsbad, CA 92008

Client:	Protea Senior Living-Oceanside,LLC
Project Name:	Parcel #2
Project No.:	AAA-72646.4
Date:	10/18/18
Boring/Sample No:	B-13
Depth/Location:	0-5 ft
Soil Description:	Grey-Brn. Sandy Silt ML
Tested by:	B D

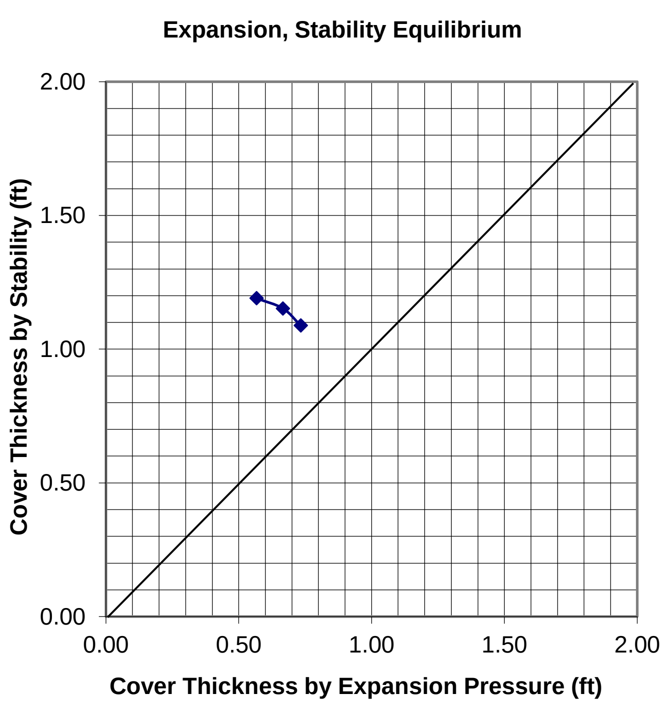
TEST SPECIMEN		A	B	C	D
Compactor air pressure	**PSI**	160	110	70	
Water added	**%**	3.6	4.8	7.0	
Moisture at compaction	**%**	15.8	17.0	19.2	
Height of sample	**IN**	2.52	2.67	2.6	
Dry density	**PCF**	113.6	109.0	106.4	
R-Value by exudation		15	10	7	
R-Value by exudation, corrected		15	10	7	
Exudation pressure	**PSI**	449	340	183	
Stability thickness	**FT**	1.09	1.15	1.19	
Expansion pressure thickness	**FT**	0.73	0.67	0.57	

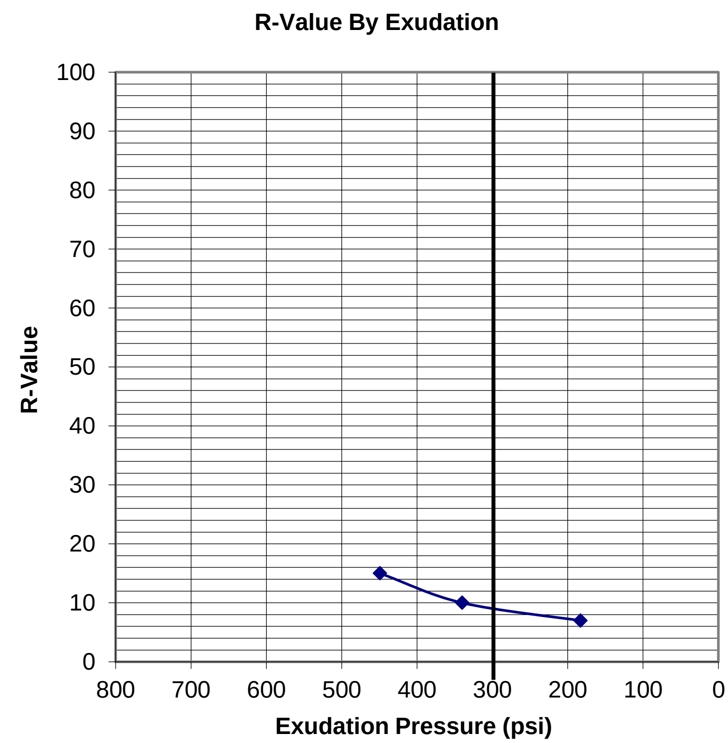
DESIGN CALCULATION DATA

Traffic index, assumed	5.0
Gravel equivalent factor, assumed	1.25
Expansion, stability equilibrium	
R-Value by expansion	NA
R-Value by exudation	9
R-Value at equilibrium	**9**

SAMPLE INFORMATION

Sample Location: B-11, 0-5ft
Sample Description: Light Olive Brown Sandy Clay
Notes: AAA-72646.4
0% Retained on 3/4 inch sieve
Test Method: Cal-Trans Test 301





GeoSoils, Inc.
5741 Palmer Way
Carlsbad, CA 92008
Telephone: (760) 438-3155
Fax: (760) 931-0915

9/2/2010

R - VALUE TEST RESULTS

Project: EEI Tiger

Number: 5932-E-SC

Date: October 2018 Plate: 1

L A B O R A T O R Y   R E P O R T

Telephone (619) 425-1993   Fax 425-7917   Established 1928

C L A R K S O N L A B O R A T O R Y A N D S U P P L Y I N C.
350 Trousdale Dr. Chula Vista, Ca. 91910 www.clarksonlab.com
A N A L Y T I C A L A N D C O N S U L T I N G C H E M I S T S

Date: October 16, 2018
Purchase Order Number: AAA-72646-4
Sales Order Number: 41926
Account Number: EEI

To:

EEI Environmental Equalizers Inc
2195 Faraday Avenue Suite K
Carlsbad, CA 92008
Attention: Jeff Blake

Laboratory Number: SO7060   Customers Phone: 760-431-3747

Sample Designation:

One soil sample received on 10/12/18 at 3:45pm,
taken from Parcel #2 Project#AAA-72646-4
marked as B-13@0'-5'.

Analysis By California Test 643, 1999, Department of Transportation
Division of Construction, Method for Estimating the Service Life of
Steel Culverts.

pH 7.0

Water Added (ml)	Resistivity (ohm-cm)
10	1700
5	1000
5	710
5	550
5	520
5	540
5	570

17 years to perforation for a 16 gauge metal culvert.
22 years to perforation for a 14 gauge metal culvert.
30 years to perforation for a 12 gauge metal culvert.
38 years to perforation for a 10 gauge metal culvert.
47 years to perforation for a 8 gauge metal culvert.

Water Soluble Sulfate	Calif. Test 417	0.025% (250ppm)
Water Soluble Chloride	Calif. Test 422	0.026% (260ppm)

Laura Torres
Laura Torres
LT/ilv

APPENDIX C
FORM I 8

Categorization of Infiltration Feasibility Condition			Form I-8
Part 1 - Full Infiltration Feasibility Screening Criteria **Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: Based on our percolation testing at the site, the calculated Infiltration Rate at both test borings is 0.11 in/hr with a factor of safety of 2.0 applied. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: Measured infiltration rates are less than 0.5 in/hr (see Criteria 1). Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Form I-8 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Measured infiltration rates are less than 0.5 in/hr (see Criteria 1). Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Measured infiltration rates are less than 0.5 in/hr (see Criteria 1). Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		No, Full Infiltration is not considered to be feasible

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Form I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

Percolation testing was conducted within two borings at depths of approximately 15 and 9 feet below existing ground surface. Tests were run at intervals of 30 minutes for each boring, and the resulting percolation rate was converted to an infiltration rate using the Porchet Method. A factor of safety of 2.0 was applied to the calculated infiltration rate, per the City of Oceanside/County of San Diego BMP guidelines. The measured infiltration rate at both borings is 0.11 in/hr.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Criteria	Screening Question	Yes	No
6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

Percolation testing was conducted within decomposed granitic bedrock, which has the consistency of sandy clay and clayey sand, and is the reason for the low infiltration rates. While the measured infiltration could technically allow for partial infiltration at the site, they could also pose a hazard to utilities for the proposed development.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

<table>
<tr><th colspan="4">Form I-8 Page 4 of 4</th></tr>
<tr><td>Criteria</td><td>Screening Question</td><td>Yes</td><td>No</td></tr>
<tr><td>7</td><td>Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:

Groundwater was not encountered during our subsurface investigation to the maximum depth of 17.5 feet below ground surface. There are no known contaminants onsite.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</td></tr>
<tr><td>8</td><td>Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td></td><td></td></tr>
<tr><td colspan="4">Provide basis:

This question requires the expertise of water-rights lawyers to determine if any violation can be expected downstream by reducing the run-off slightly via infiltration of the water into bioretention or stormwater devices

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</td></tr>
<tr><td>Part 2 Result*</td><td colspan="2">If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.

If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</td><td>Partial Infiltration may be feasible</td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

APPENDIX D
EARTHWORK AND GRADING GUIDELINES

EEI Engineering Solutions

EARTHWORK AND GRADING GUIDELINES

GENERAL

These guidelines present general procedures and recommendations for earthwork and grading as required on the approved grading plans, including preparation of areas to be filled, placement of fill and installation of subdrains and excavations. The recommendations contained in the geotechnical report are applicable to each specific project, are part of the earthwork and grading guidelines and would supersede the provisions contained hereafter in the case of conflict. Observations and/or testing performed by the consultant during the course of grading may result in revised recommendations which could supersede these guidelines or the recommendations contained in the geotechnical report. Figures A through O is provided at the back of this appendix, exhibiting generalized cross sections relating to these guidelines.

The contractor is responsible for the satisfactory completion of all earthworks in accordance with provisions of the project plans and specifications. The project soil engineer and engineering geologist (geotechnical consultant) or their representatives should provide observation and testing services, and geotechnical consultation throughout the duration of the project.

EARTHWORK OBSERVATIONS AND TESTING

Geotechnical Consultant

Prior to the commencement of grading, a qualified geotechnical consultant (a soil engineer and engineering geologist) should be employed for the purpose of observing earthwork procedures and testing the fills for conformance with the recommendations of the geotechnical report, the approved grading plans, and applicable grading codes and ordinances.

The geotechnical consultant should provide testing and observation so that determination may be made that the work is being completed as specified. It is the responsibility of the contractor to assist the consultant and keep them aware of work schedules and predicted changes, so that the consultant may schedule their personnel accordingly.

All removals, prepared ground to receive fill, key excavations, and subdrains should be observed and documented by the project engineering geologist and/or soil engineer prior to placing any fill. It is the contractor's responsibility to notify the engineering geologist and soil engineer when such areas are ready for observation.

Laboratory and Field Tests

Maximum dry density tests to determine the degree of compaction should be performed in accordance with American Standard Testing Materials test method ASTM designation D-1557-78. Random field compaction tests should be performed in accordance with test method ASTM designations D-1556-82, D-2937 or D-2922 & D-3017, at intervals of approximately two feet of fill height per 10,000 sq. ft. or every one thousand cubic yards of fill placed. These criteria would vary depending on the soil conditions and the size of the project. The location and frequency of testing would be at the discretion of the geotechnical consultant

Contractor's Responsibility

All clearing, site preparation, and earthwork performed on the project should be conducted by the contractor, with observation by geotechnical consultants and staged approval by the appropriate governing agencies. It is the contractor's responsibility to prepare the ground surface to receive the fill to the satisfaction of the soil engineer, and to place, spread, moisture condition, mix and compact the fill in accordance with the recommendations of the soil engineer. The contractor should also remove all major deleterious material considered unsatisfactory by the soil engineer.

It is the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the earthwork in accordance with applicable grading guidelines, codes or agency ordinances, and approved grading plans. Sufficient watering apparatus and compaction equipment should be provided by the contractor with due consideration for the fill material, rate of placement, and climatic conditions. If, in the opinion of the geotechnical consultant, unsatisfactory conditions such as questionable weather, excessive oversized rock, deleterious material or insufficient support equipment are resulting in a quality of work that is not acceptable, the consultant will inform the contractor, and the contractor is expected to rectify the conditions, and if necessary, stop work until conditions are satisfactory.

The contractor will properly grade all surfaces to maintain good drainage and prevent ponding of water. The contractor will take action to control surface water and to prevent erosion control measures that have been installed.

SITE PREPARATION

All vegetation including brush, trees, thick grasses, organic debris, and other deleterious material should be removed and disposed of offsite, and must be concluded prior to placing fill. Existing fill, soil, alluvium, colluvium, or rock materials determined by the soil engineer or engineering geologist as unsuitable for structural in-place support should be removed prior to fill placement. Depending upon the soil conditions, these materials may be reused as compacted fills. Any materials incorporated as part of the compacted fills should be approved by the soil engineer.

Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipelines, or other structures not located prior to grading are to be removed or treated in a manner recommended by the soil engineer. Soft, dry, spongy, highly fractured, or otherwise unsuitable ground extending to such a depth that surface processing cannot adequately improve the condition should be over excavated down to firm ground and approved by the soil engineer before compaction and filling operations continue. Over excavated and processed soils which have been properly mixed and moisture-conditioned should be recompacted to the minimum relative compaction as specified in these guidelines.

Existing ground which is determined to be satisfactory for support of the fills should be scarified to a minimum depth of 6 inches, or as directed by the soil engineer. After the scarified ground is brought to optimum moisture (or greater) and mixed, the materials should be compacted as specified herein. If the scarified zone is greater than 6 inches in depth, it may be necessary to remove the excess and place the material in lifts restricted to 6 inches in compacted thickness.

Existing grind which is not satisfactory to support compacted fill should be over excavated as required in the geotechnical report or by the onsite soils engineer and/or engineering geologists. Scarification, discing, or other acceptable form of mixing should continue until the soils are broken down and free of large fragments or clods, until the working surface is reasonably uniform and free from ruts, hollows, hummocks, or other uneven features which would inhibit compaction as described above.

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical) gradient, the ground should be benched. The lowest bench, which will act as a key, should be a minimum of 12 feet wide and should be at least two feet deep into competent material, approved by the soil engineer and/or engineering geologist. In fill over cut slope conditions, the recommended minimum width of the lowest bench or key is at least 15 feet with the key excavated on competent material, as designated by the Geotechnical Consultant. As a general rule, unless superseded by the Soil Engineer, the minimum width of fill keys should be approximately equal to one-half (½) the height of the slope.

Standard benching is typically four feet (minimum) vertically, exposing competent material. Benching may be used to remove unsuitable materials, although it is understood that the vertical height of the bench may exceed four feet. Pre stripping may be considered for removal of unsuitable materials in excess of four feet in thickness.

All areas to receive fill, including processed areas, removal areas, and toe of fill benches should be observed and approved by the soil engineer and/or engineering geologist prior to placement of fill. Fills may then be properly placed and compacted until design grades are attained.

COMPACTED FILLS

Earth materials imported or excavated on the property may be utilized as fill provided that each soil type has been accepted by the soil engineer. These materials should be free of roots, tree branches, other organic matter or other deleterious materials. All unsuitable materials should be removed from the fill as directed by the soil engineer. Soils of poor gradation, undesirable expansion potential, or substandard strength characteristics may be designated unsuitable by the consultant and may require mixing with other earth materials to serve as a satisfactory fill material.

Fill materials generated from benching operations should be dispersed throughout the fill area. Benching operations should not result in the benched material being placed only within a single equipment width away from the fill/bedrock contact.

Oversized materials, defined as rock or other irreducible materials with a maximum size exceeding 12 inches in one dimension, should not be buried or placed in fills unless the location of materials and disposal methods are specifically approved by the soil engineer. Oversized material should be taken offsite or placed in accordance with recommendations of the soil engineer in areas designated as suitable for rock disposal. Oversized material should not be placed vertically within 10 feet of finish grade or horizontally within 20 feet of slope faces.

To facilitate trenching, rock should not be placed within the range of foundation excavations or future utilities unless specifically approved by the soil engineer and/or the representative developers.

If import fill material is required for grading, representative samples of the material should be analyzed in the laboratory by the soil engineer to determine its physical properties. If any material other than that previously analyzed is imported to the fill or encountered during grading, analysis of this material should be conducted by the soil engineer as soon as practical.

Fill material should be placed in areas prepared to receive fill in near-horizontal layers that should not exceed six inches compacted in thickness. The soil engineer may approve thicker lifts if testing indicates the grading procedures are such that adequate compaction is being achieved. Each layer should be spread evenly and mixed to attain uniformity of material and moisture suitable for compaction.

Fill materials at moisture content less than optimum should be watered and mixed, and “wet” fill materials should be aerated by scarification, or should be mixed with drier material. Moisture conditioning and mixing of fill materials should continue until the fill materials have uniform moisture content at or above optimum moisture.

After each layer has been evenly spread, moisture-conditioned and mixed, it should be uniformly compacted to a minimum of 90 percent of maximum density as determined by ASTM test designation, D 1557-78, or as otherwise recommended by the soil engineer. Compaction equipment should be adequately sized and should be reliable to efficiently achieve the required degree of compaction.

Where tests indicate that the density of any layer of fill, or portion thereof, is below the required relative compaction or improper moisture content, the particular layer or portion will be reworked until the required density and/or moisture content has been attained. No additional fill will be placed in an area until the last placed lift of fill has been tested and found to meet the density and moisture requirements, and is approved by the soil engineer.

Compaction of slopes should be accomplished by over-building the outside edge a minimum of three feet horizontally, and subsequently trimming back to the finish design slope configuration. Testing will be performed as the fill is horizontally placed to evaluate compaction as the fill core is being developed. Special efforts may be necessary to attain the specified compaction in the fill slope zone. Final slope shaping should be performed by trimming and removing loose materials with appropriate equipment. A final determination of fill slope compaction should be based on observation and/or testing of the finished slope face.

If an alternative to over-building and cutting back the compacted fill slope is selected, then additional efforts should be made to achieve the required compaction in the outer 10 feet of each lift of fill by undertaking the following:

- Equipment consisting of a heavy short-shanked sheepsfoot should be used to roll (horizontal) parallel to the slopes continuously as fill is placed. The sheepsfoot roller should also be used to roll perpendicular to the slopes, and extend out over the slope to provide adequate compaction to the face slope.

- Loose fill should not be spilled out over the face of the slope as each lift is compacted. Any loose fill spilled over a previously completed slope face should be trimmed off or be subject to re-rolling.

- Field compaction tests will be made in the outer two to five feet of the slope at two to three foot vertical intervals, subsequent to compaction operations.

- After completion of the slope, the slope face should be shaped with a small dozer and then re-rolled with a sheepsfoot to achieve compaction to near the slope face. Subsequent to testing to verify compaction, the slopes should be grid-rolled to achieve adequate compaction to the slope face. Final testing should be used to confirm compaction after grid rolling.

- Where testing indicates less than adequate compaction, the contractor will be responsible to process, moisture condition, mix and recompact the slope materials as necessary to achieve compaction. Additional testing should be performed to verify compaction.

- Erosion control and drainage devices should be designed by the project civil engineer in compliance with the ordinances of the controlling governmental agencies, and/or in accordance with the recommendations of the soil engineer or engineering geologist.

EXCAVATIONS

Excavations and cut slopes should be observed and mapped during grading by the engineering geologist. If directed by the engineering geologist, further excavations or over-excavation and refilling of cut areas should be performed. When fills over cut slopes are to be graded, the cut portion of the slope should be observed by the engineering geologist prior to placement of the overlying fill portion of the slope. The engineering geologist should observe all cut slopes and should be notified by the contractor when cut slopes are started.

If, during the course of grading, unanticipated adverse or potentially adverse geologic conditions are encountered, the engineering geologist and soil engineer should investigate, evaluate and make recommendations to mitigate (or limit) these conditions. The need for cut slope buttressing or stabilizing should be based on as-grading evaluations by the engineering geologist, whether anticipated previously or not.

Unless otherwise specified in soil and geological reports, no cut slopes should be excavated higher or steeper than that allowed by the ordinances of controlling governmental agencies. Additionally, short-term stability of temporary cut slopes is the contractor's responsibility.

Erosion control and drainage devices should be designed by the project civil engineer and should be constructed in compliance with the ordinances of the controlling governmental agencies, and/or in accordance with the recommendations of the soil engineer or engineering geologist.

SUBDRAIN INSTALLATION

Subdrains should be installed in accordance with the approved embedment material, alignment and details indicated by the geotechnical consultant. Subdrain locations or construction materials should not be changed or modified without approval of the geotechnical consultant. The soil engineer and/or engineering geologist may recommend and direct changes in subdrain line, grade and drain material in the field, pending exposed conditions. The location of constructed subdrains should be recorded by the project civil engineer.

COMPLETION

Consultation, observation and testing by the geotechnical consultant should be completed during grading operations in order to state an opinion that all cut and filled areas are graded in accordance with the approved project specifications.

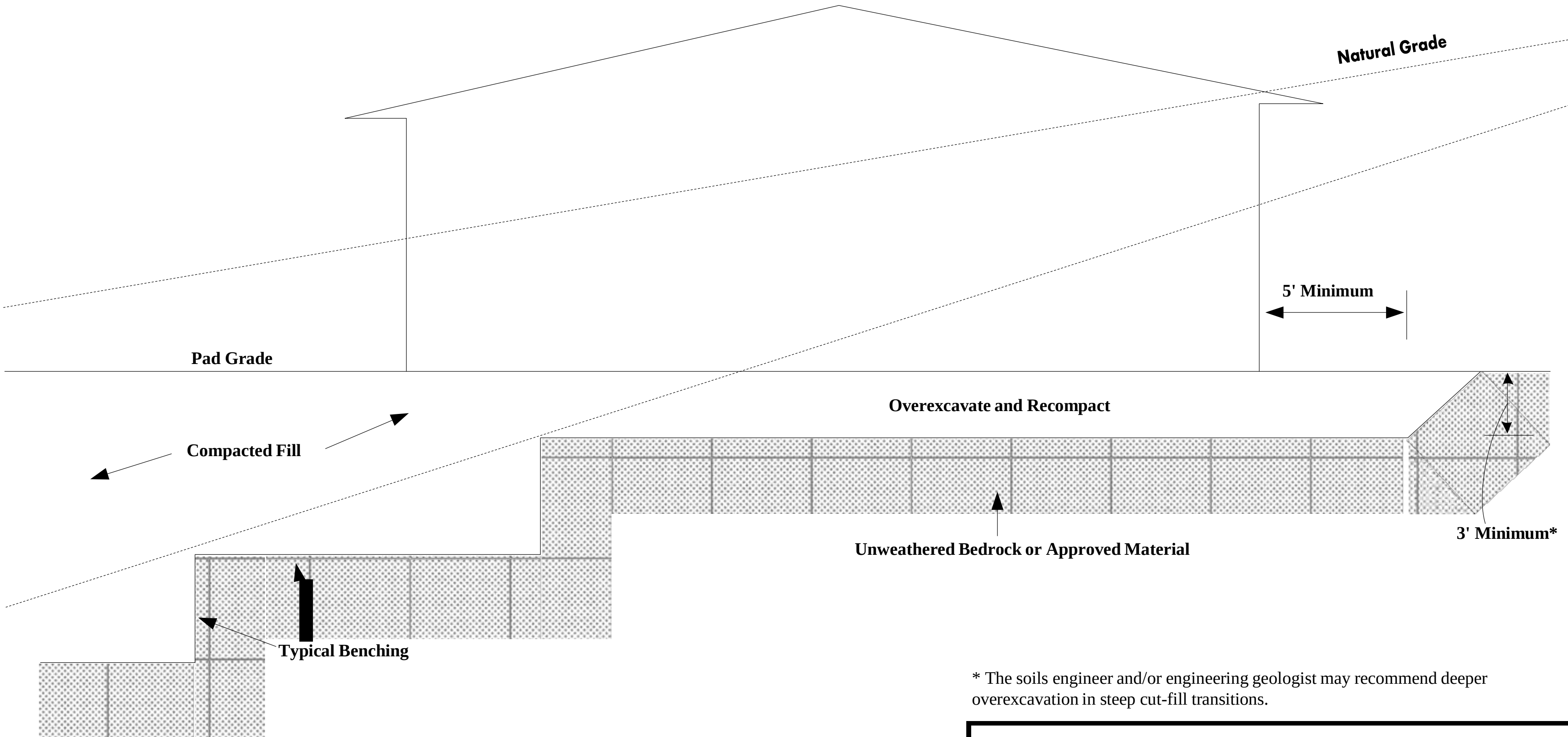
After completion of grading and after the soil engineer and engineering geologist have finished their observations, final reports should be submitted subject to review by the controlling governmental agencies. No additional grading should be undertaken without prior notification of the soil engineer and/or engineering geologist.

All finished cut and fill slopes should be protected from erosion, including but not limited to planting in accordance with the plan design specifications and/or as recommended by a landscape architect. Such protection and/or planning should be undertaken as soon as possible after completion of grading.

ATTACHMENTS

Figure A – Transition Lot Detail Cut Lot
Figure B – Transition Lot Detail Cut - Fill
Figure C – Rock Disposal Pits
Figure D – Detail for Fill Slope Toeing out on a Flat Alluviated Canyon
Figure E – Removal Adjacent to Existing Fill
Figure F – Daylight Cut Lot Detail
Figure G – Skin Fill of Natural Ground
Figure H – Typical Stabilization Buttress Fill Design
Figure I – Stabilization Fill for Unstable Material Exposed in Portion of Cut Slope
Figure J – Fill Over Cut Detail
Figure K – Fill Over Natural Detail
Figure L – Oversize Rock Disposal
Figure M – Canyon Subdrain Detail
Figure N – Canyon Subdrain Alternate Details
Figure O – Typical Stabilization Buttress Subdrain Detail
Figure P – Retaining Wall Backfill

TRANSITION LOT DETAIL
CUT LOT – MATERIAL TYPE
TRANSITION



* The soils engineer and/or engineering geologist may recommend deeper overexcavation in steep cut-fill transitions.

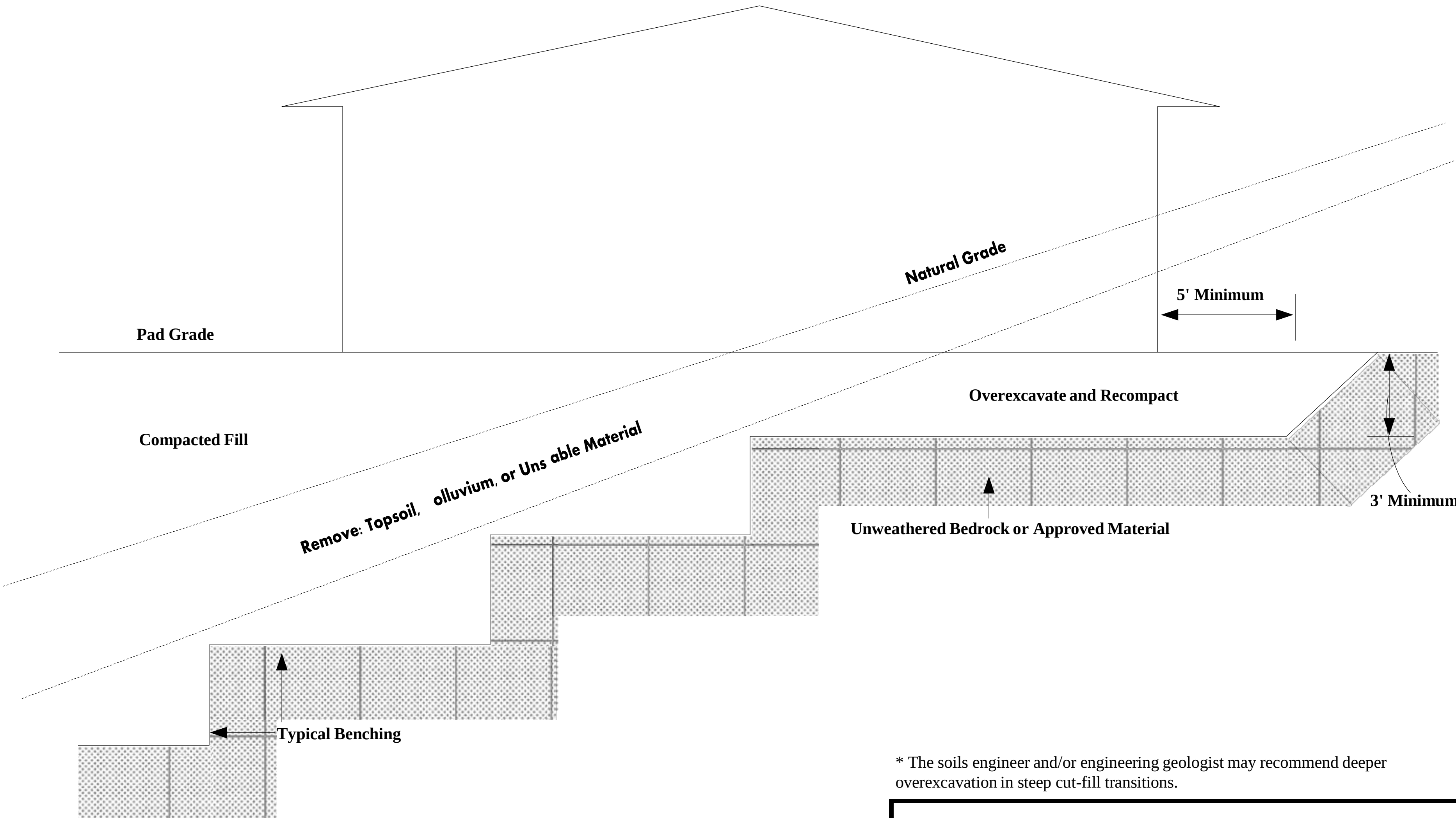
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
TRANSITION LOT DETAIL
CUT LOT – MATERIAL TYPE TRANSITION

EEI
Engineering Solutions

FIGURE A

TRANSITION LOT DETAIL
CUT – FILL – DAYLIGHT TRANSITION



* The soils engineer and/or engineering geologist may recommend deeper overexcavation in steep cut-fill transitions.

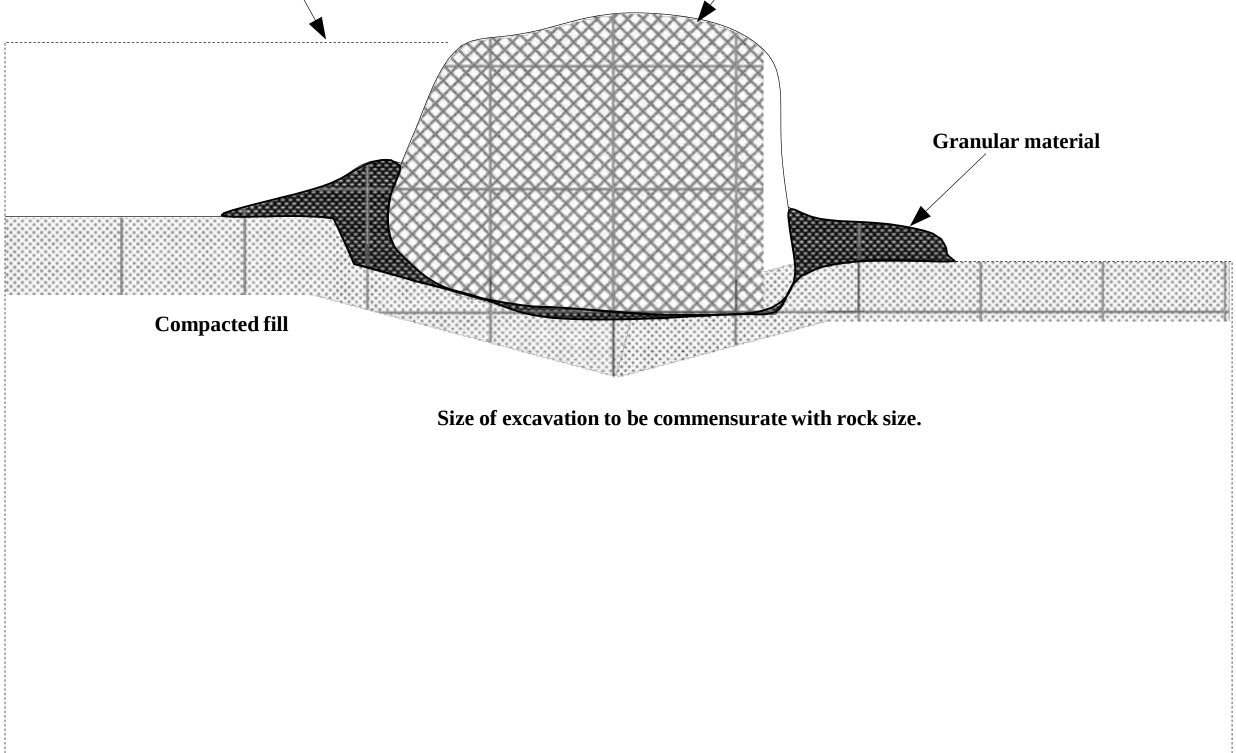
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
TRANSITION LOT DETAIL
CUT – FILL – DAYLIGHT TRANSITION

EEI
Engineering Solutions

FIGURE B

ROCK DISPOSAL PITS



Note:

(1) Large rock is defined as having a diameter larger than 3 feet in maximum size.
(2) Pit shall be excavated into compacted fill to a depth equal to half of the rock size.
(3) Granular soil shall be pushed into the pit and then flooded around the rock using a sheepsfoot to help with compaction.
(4) A minimum of 3 feet of compacted fill should be laid over each pit.
(5) Pits shall have at least 15 feet of separation between one another, horizontally.
(6) Pits shall be placed at least 20 feet from any fill slope.
(7) Pits shall be used only in deep fill areas.

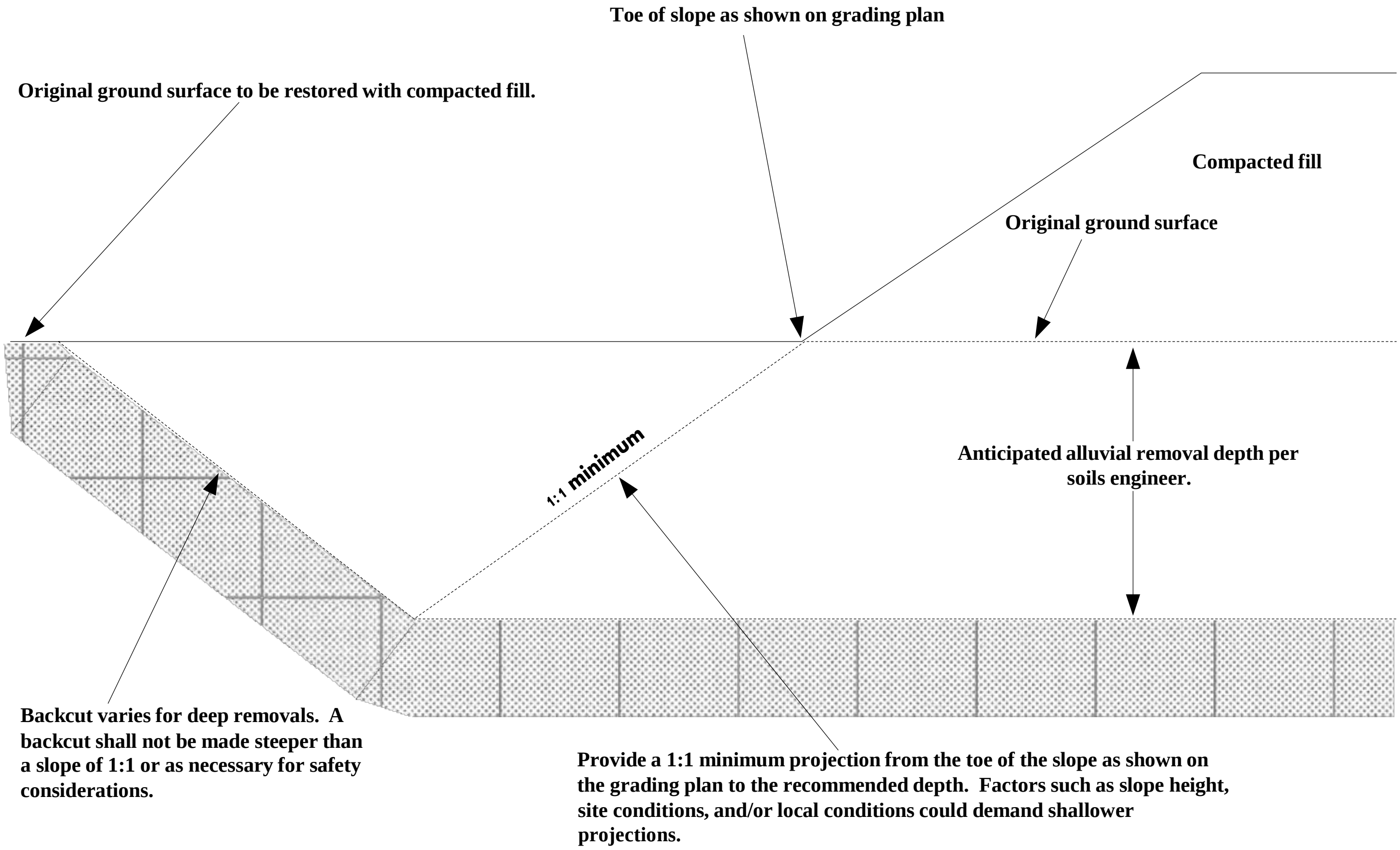
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
ROCK DISPOSAL PITS

EEI
Engineering Solutions

FIGURE C

DETAIL FOR FILL SLOPE TOEING OUT ON FLAT ALLUVIATED CANYON



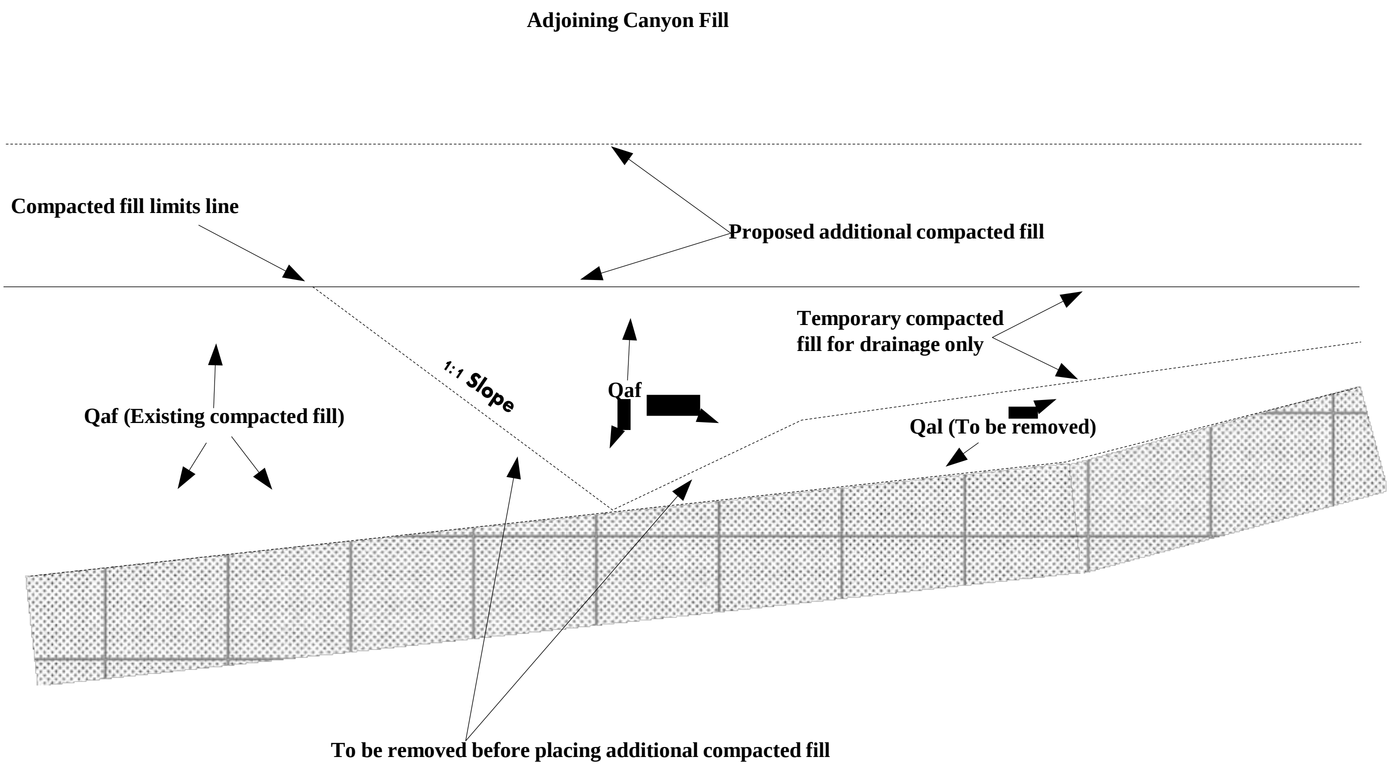
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
DETAIL FOR FILL SLOPE TOEING OUT ON A FLAT ALLUVIATED CANYON

EEI
Engineering Solutions

FIGURE D

REMOVAL ADJACENT TO EXISTING FILL



Legend

Qaf - **Artificial Fill**

Qal - **Alluvium**

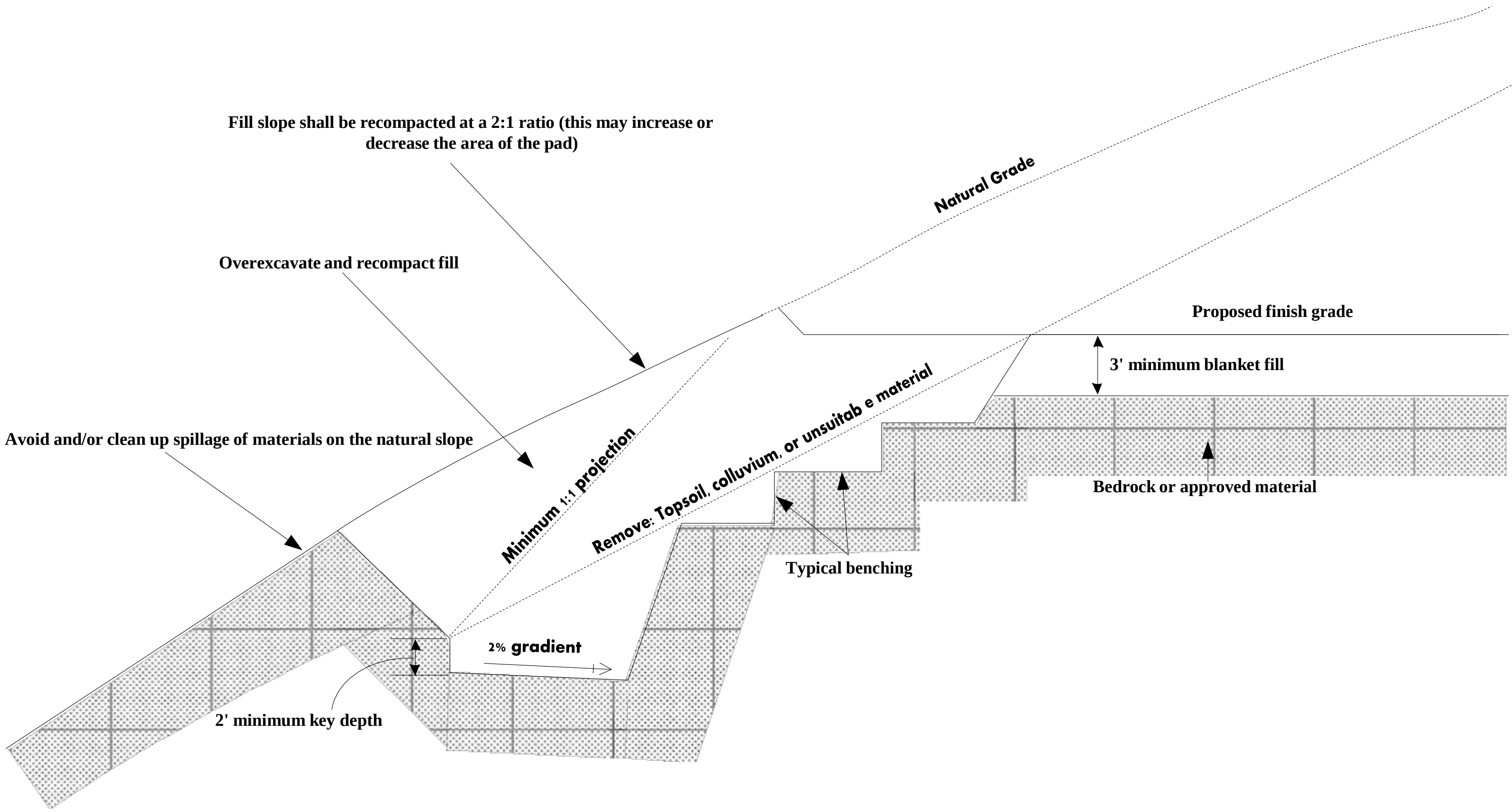
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
REMOVAL ADJACENT TO EXISTING FILL

EEI
Engineering Solutions

FIGURE E

DAYLIGHT CUT LOT DETAIL



Note: (1) Subdrain and key width requirements shall be determined based on exposed subsurface conditions and the thickness of overburden.

(2) Pad overexcavation and recompaction shall be completed if determined as necessary by the soils engineer and/or engineering geologist.

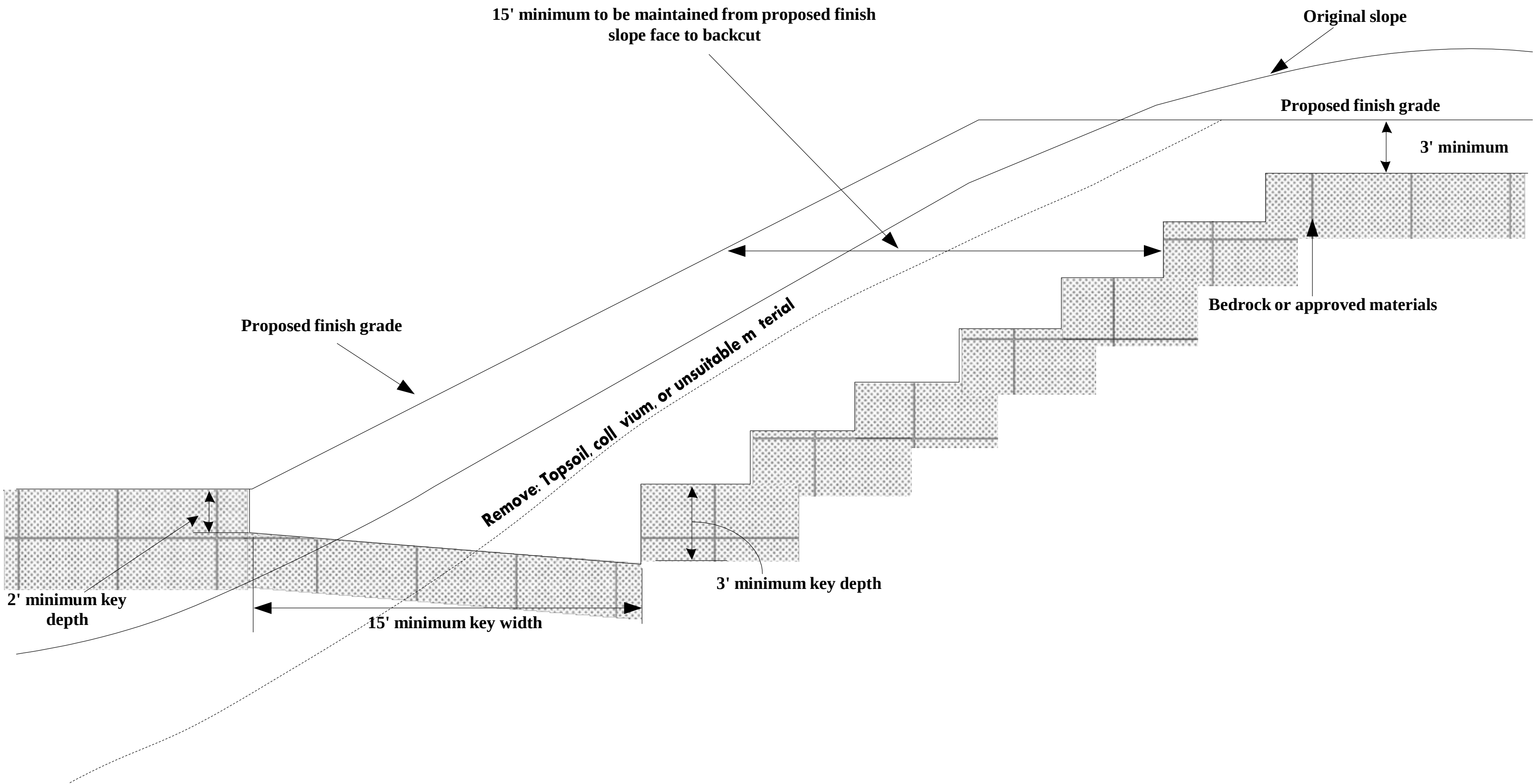
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
DAYLIGHT CUT LOT DETAIL

EEI
Engineering Solutions

FIGURE F

SKIN FILL OF NATURAL GROUND



Note: (1) The need and disposition of drains will be determined by the soils engineer and/or engineering geologist based on site conditions.

(2) Pad overexcavation and recompaction shall be completed if determined as necessary by the soils engineer and/or engineering geologist.

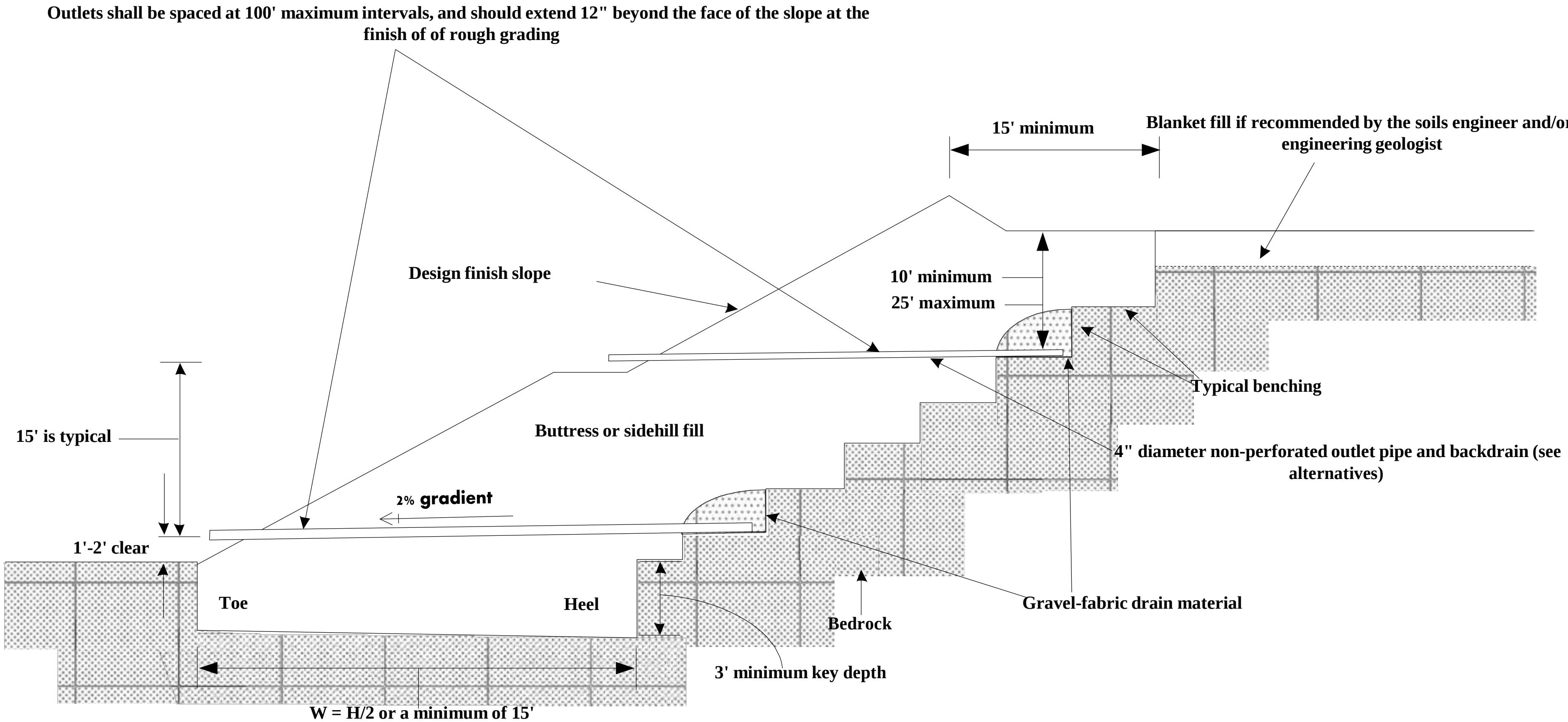
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
SKIN FILL OF NATURAL GROUND

EEI
Engineering Solutions

FIGURE G

TYPICAL STABILIZATION BUTTRESS FILL DESIGN



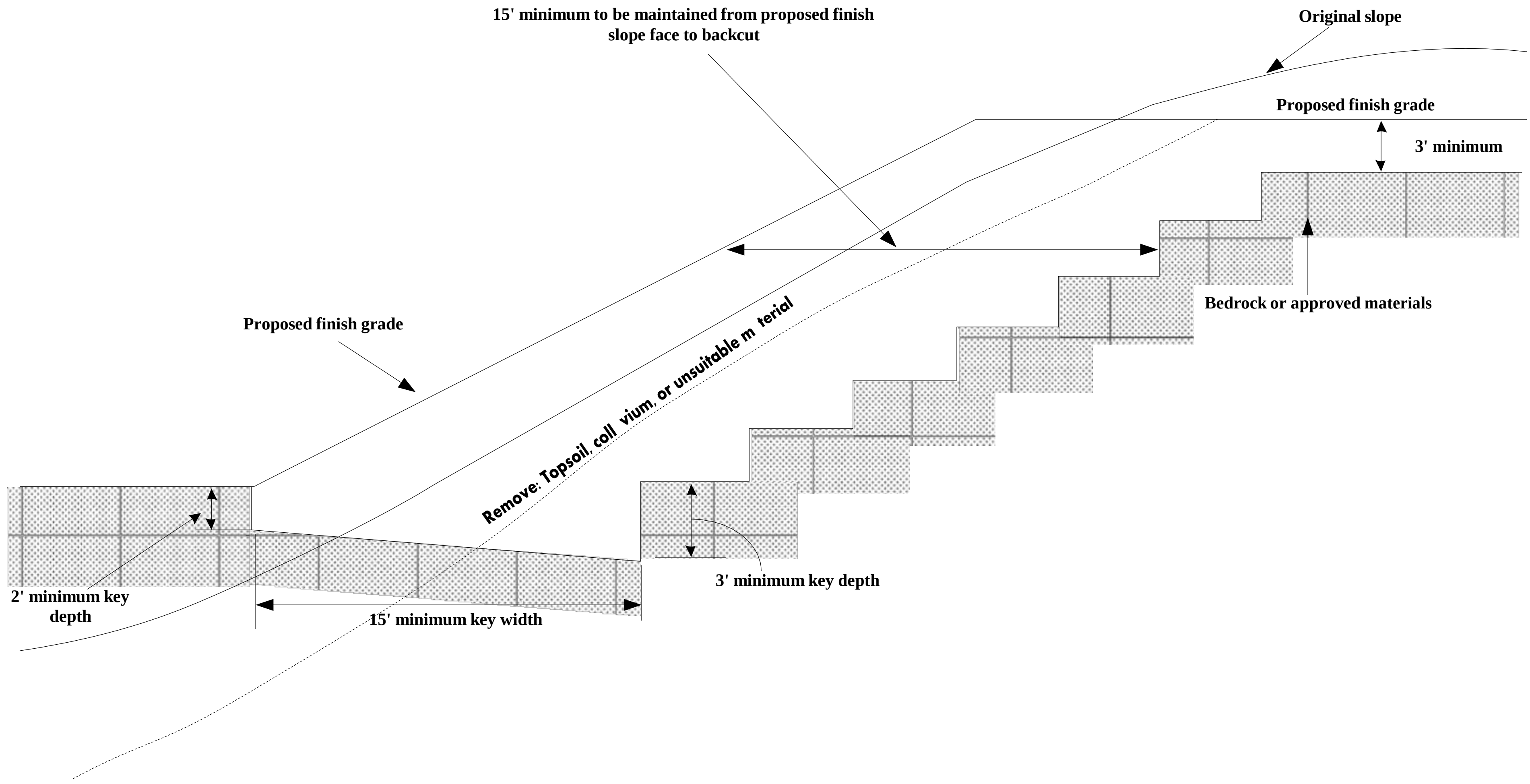
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
TYPICAL STABILIZATION BUTTRESS FILL DESIGN

EEI
Engineering Solutions

FIGURE H

SKIN FILL OF NATURAL GROUND



Note: (1) The need and disposition of drains will be determined by the soils engineer and/or engineering geologist based on site conditions.

(2) Pad overexcavation and recompaction shall be completed if determined as necessary by the soils engineer and/or engineering geologist.

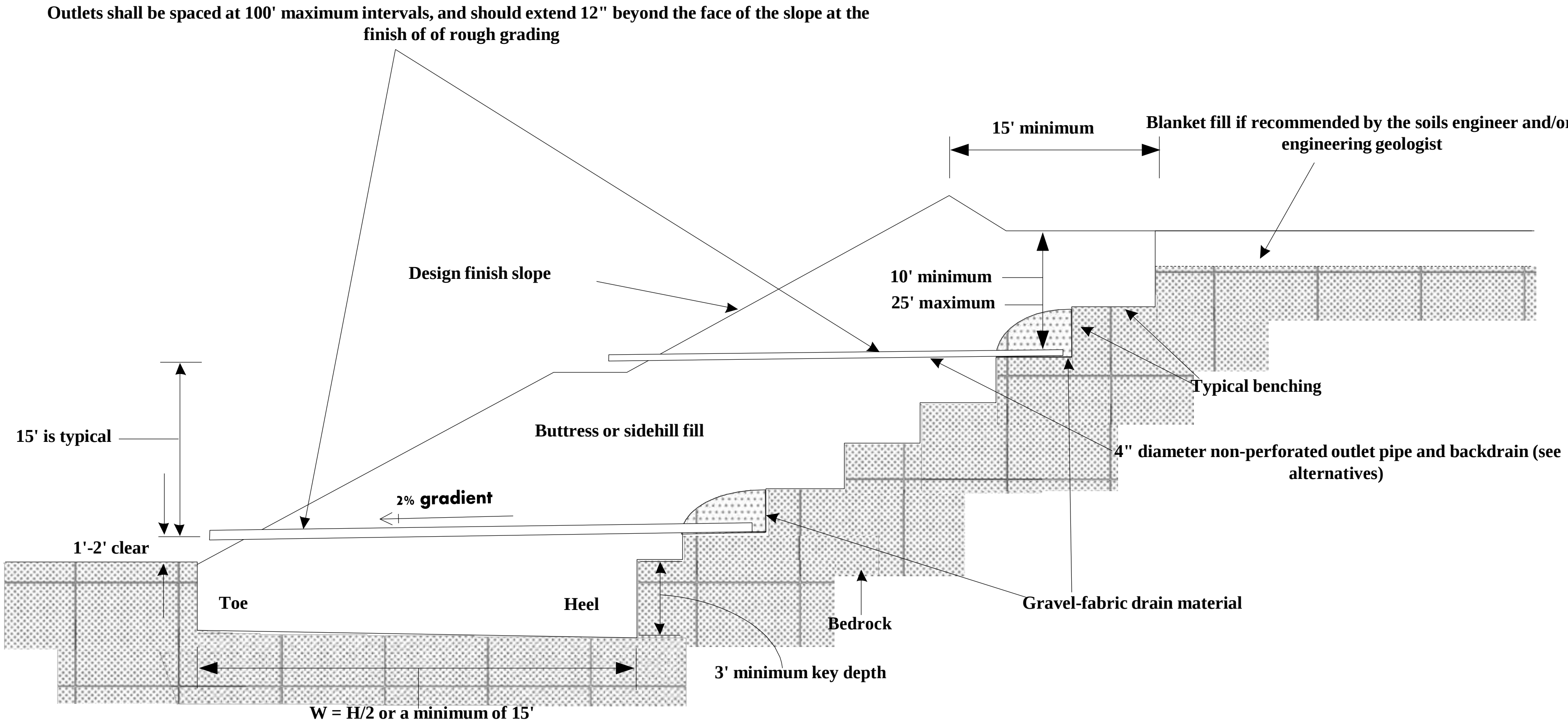
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
SKIN FILL OF NATURAL GROUND

EEI
Engineering Solutions

FIGURE G

TYPICAL STABILIZATION BUTTRESS FILL DESIGN



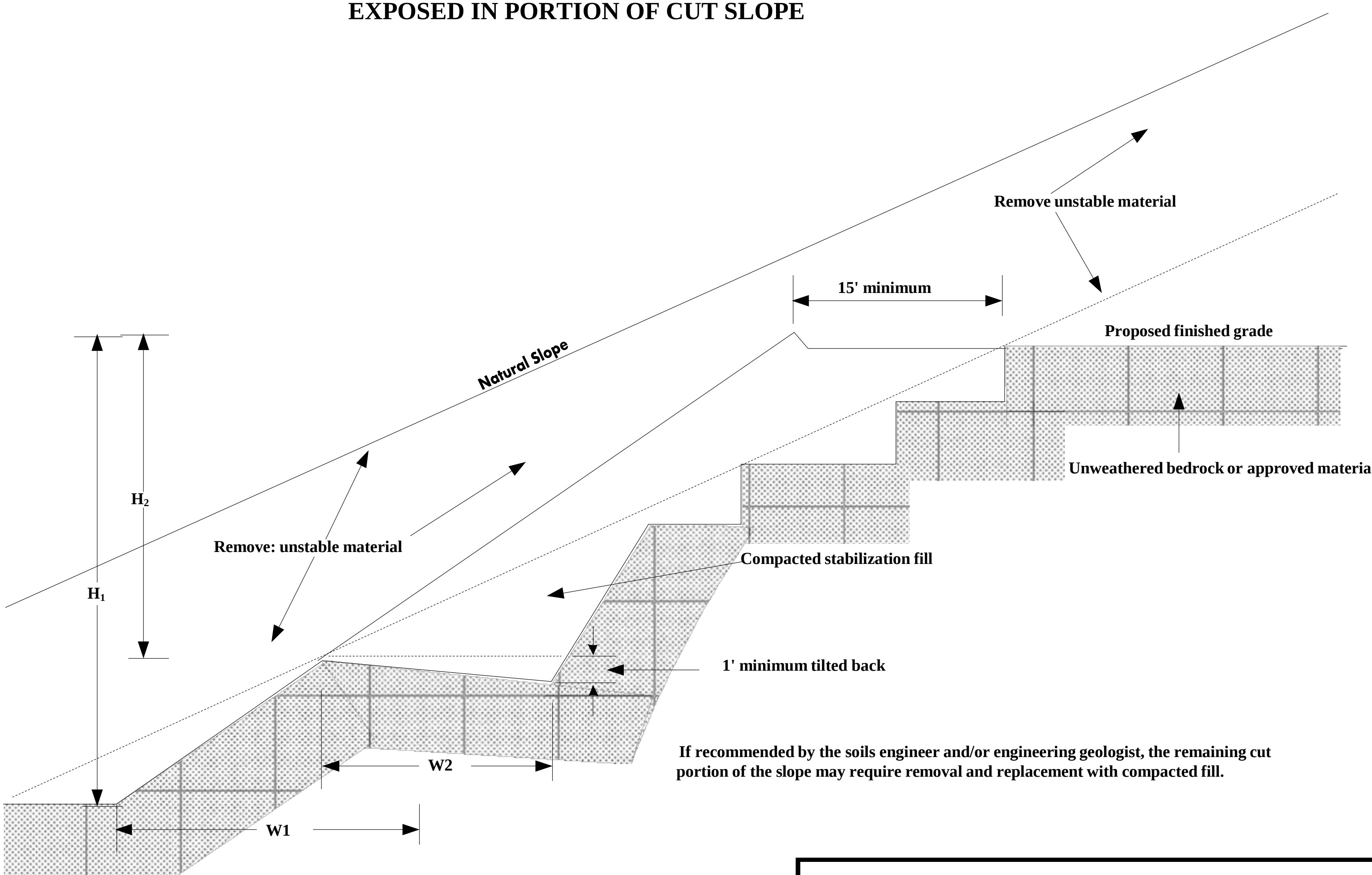
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
TYPICAL STABILIZATION BUTTRESS FILL DESIGN

EEI
Engineering Solutions

FIGURE H

STABILIZATION FILL FOR UNSTABLE MATERIAL EXPOSED IN PORTION OF CUT SLOPE



Note: (1) Subdrains are required only if specified by the soils engineer and/or engineering geologist.

(2) "W" shall be the equipment width (15') for slope heights less than 25 feet. For slopes greater than 25 feet "W" shall be determined by the project soils engineer and/or the engineering geologist. "W" shall never be less than H/2.

Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES

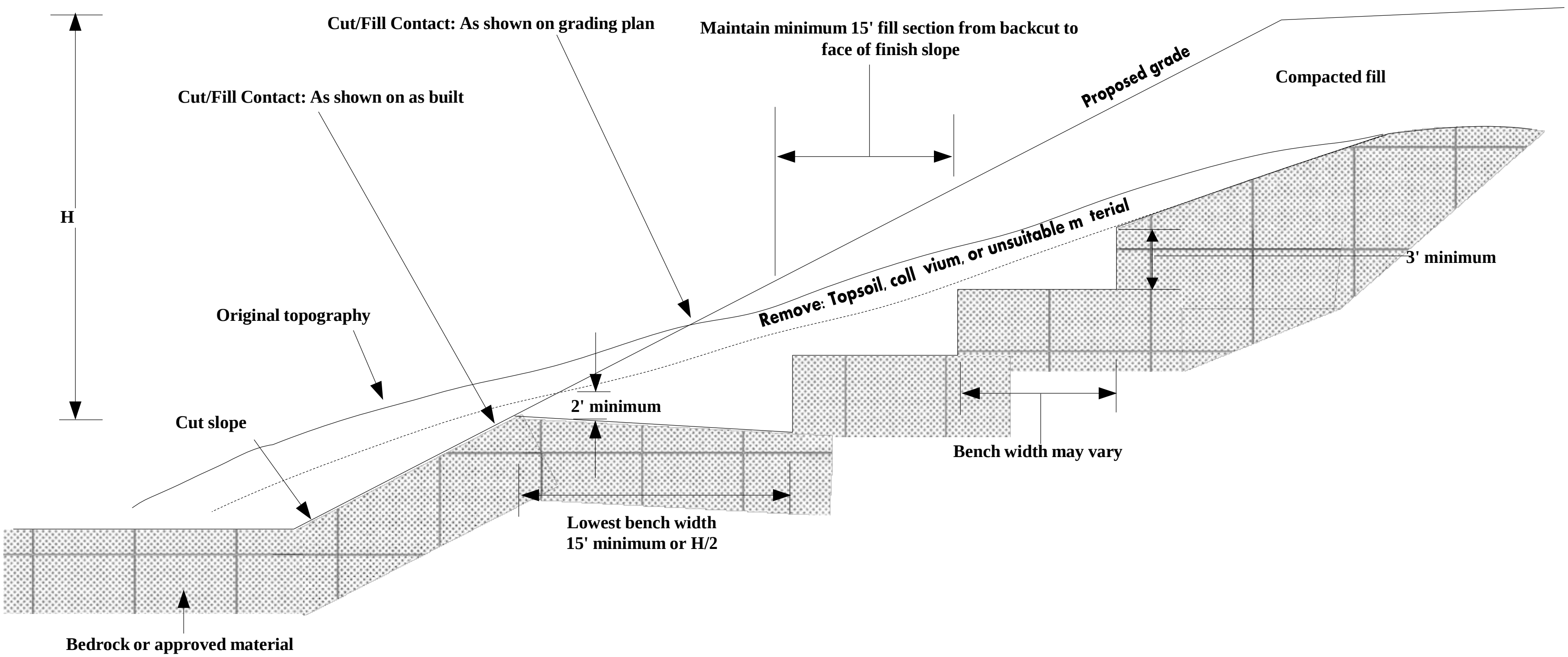
STABILIZATION FILL FOR UNSTABLE MATERIAL EXPOSED IN PORTION OF CUT SLOPE

EEI

Engineering Solutions

FIGURE I

FILL OVER CUT DETAIL



Note: The cut sectioin shall be excavated and evaluated by the soils engineer/engineering geologist prior to constructing the fill portion.

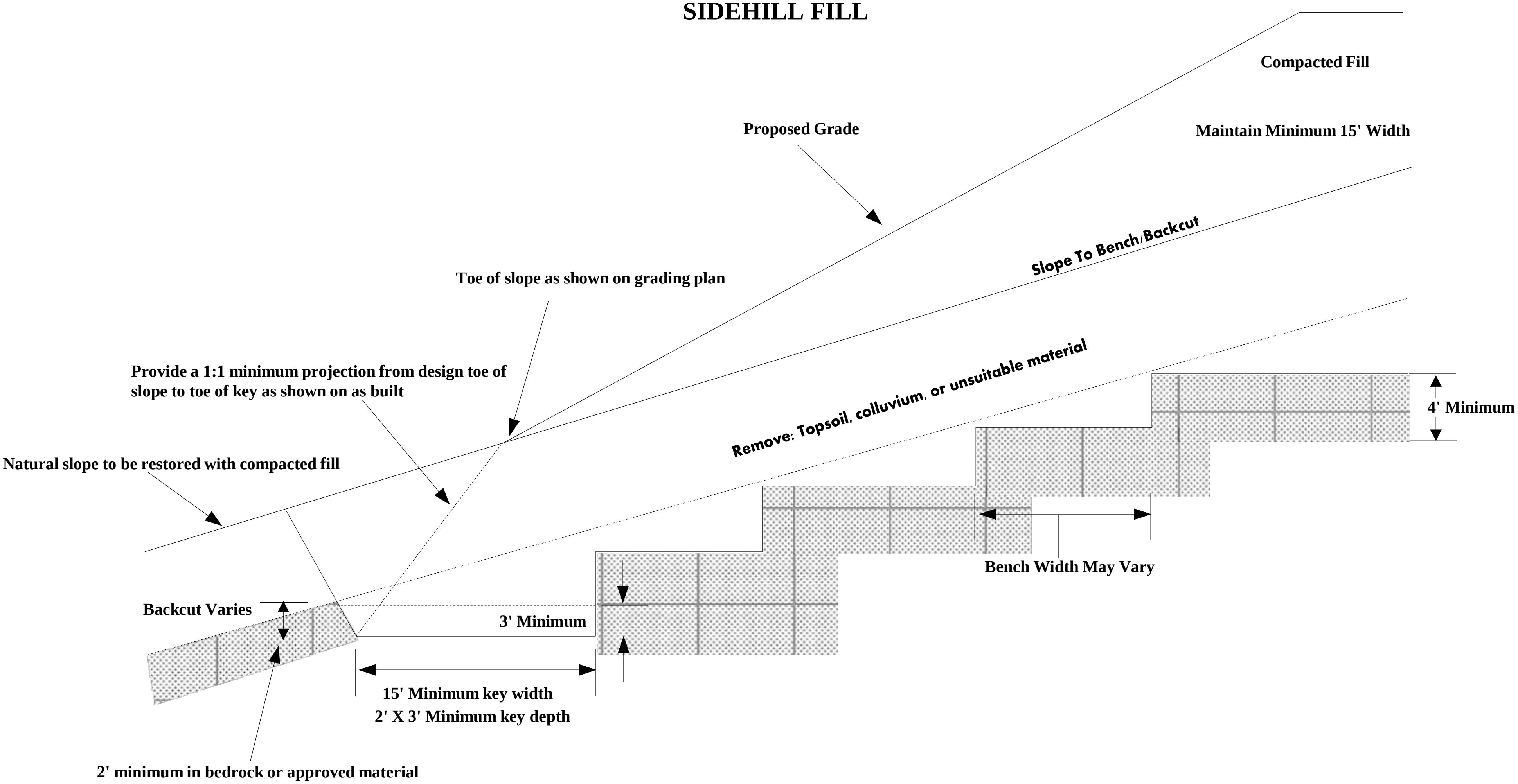
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
FILL OVER CUT DETAIL

EEI
Engineering Solutions

FIGURE J

FILL OVER NATURAL DETAIL
SIDEHILL FILL



Note: (1) Special recommendations shall be provided by the soils engineer/engineering geologist where the natural slope approaches or exceeds the design slope ratio.
(2) The need for and disposition of drains would be determined by the soils engineer/engineering geologist based upon exposed conditions.

Note: Figures not to scale

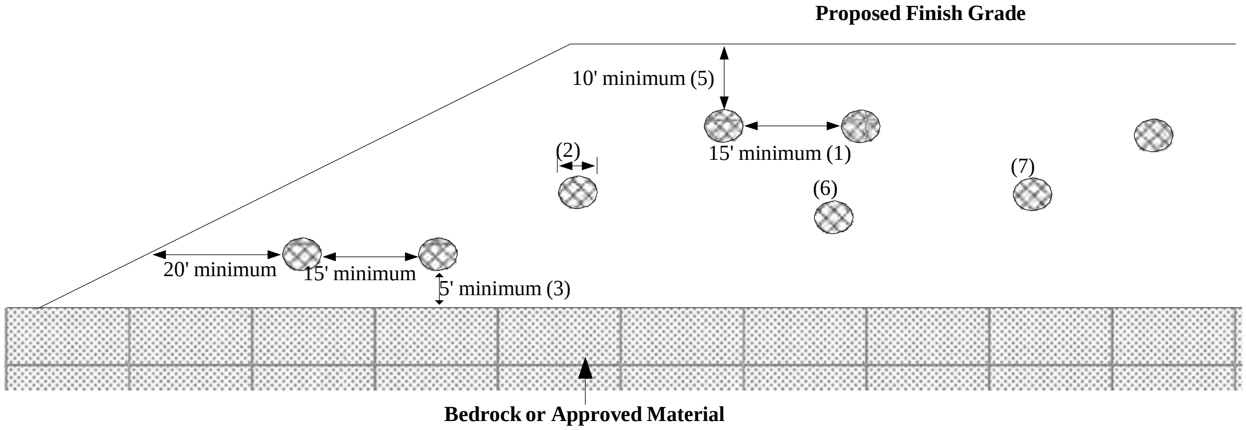
EARTHWORK AND GRADING GUIDELINES
FILL OVER NATURAL DETAIL SIDEHILL FILL

EEI
Engineering Solutions

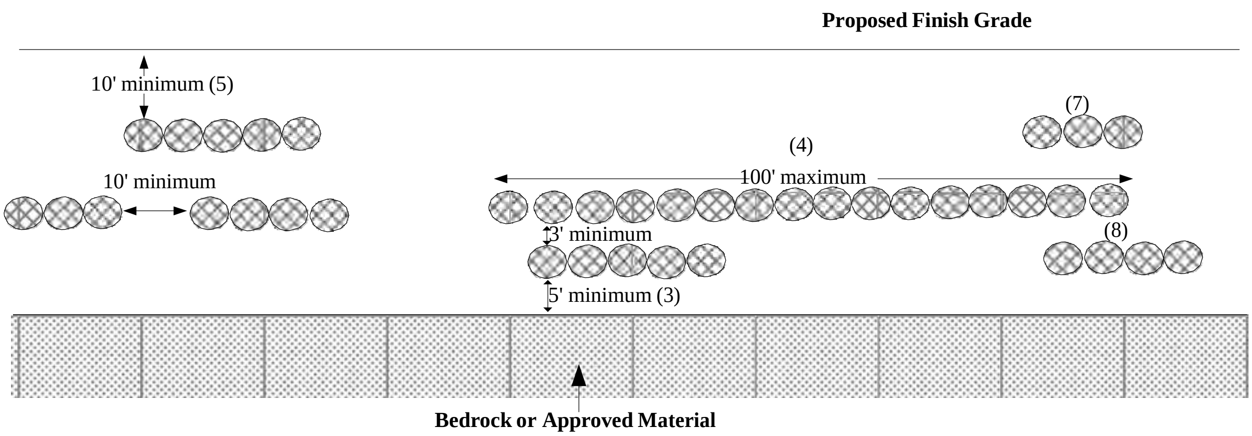
FIGURE K

OVERSIZE ROCK DISPOSAL

View Normal to Slope Face

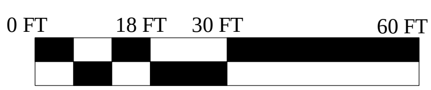


View Parallel to Slope Face



Note:
(1) One Equipment width or a minimum of 15 feet.
(2) Height and width may vary depending on rock size and type of equipment used. Length of windrow shall be no greater than 100 feet maximum.
(3) If approved by the soils engineer and/or engineering geologist.
(4) Orientation of windrows may vary but shall be as recommended by the soils engineer and/or engineering geologist. Unless recommended staggering of windrows is not necessary.
(5) Areas shall be cleared for utility trenches, foundations, and swimming pools.
(6) Voids in windrows shall be filled by flooding granular soil into place. Granular soil shall be any soil which has a unified soil classification system (Universal Building Code (UBC) 29-1). Designation of SM, SP, SW, GP, or GW.
(7) After fill between windrows is placed and compacted with the lift of fill covering windrow, windrow shall be proof rolled with a D-9 dozer or equivalent.
(8) Oversized rock is defined as larger than 12", and less than 4 feet in size.

Approximate Scale: 1" = 30'



Note: All distances are approximate

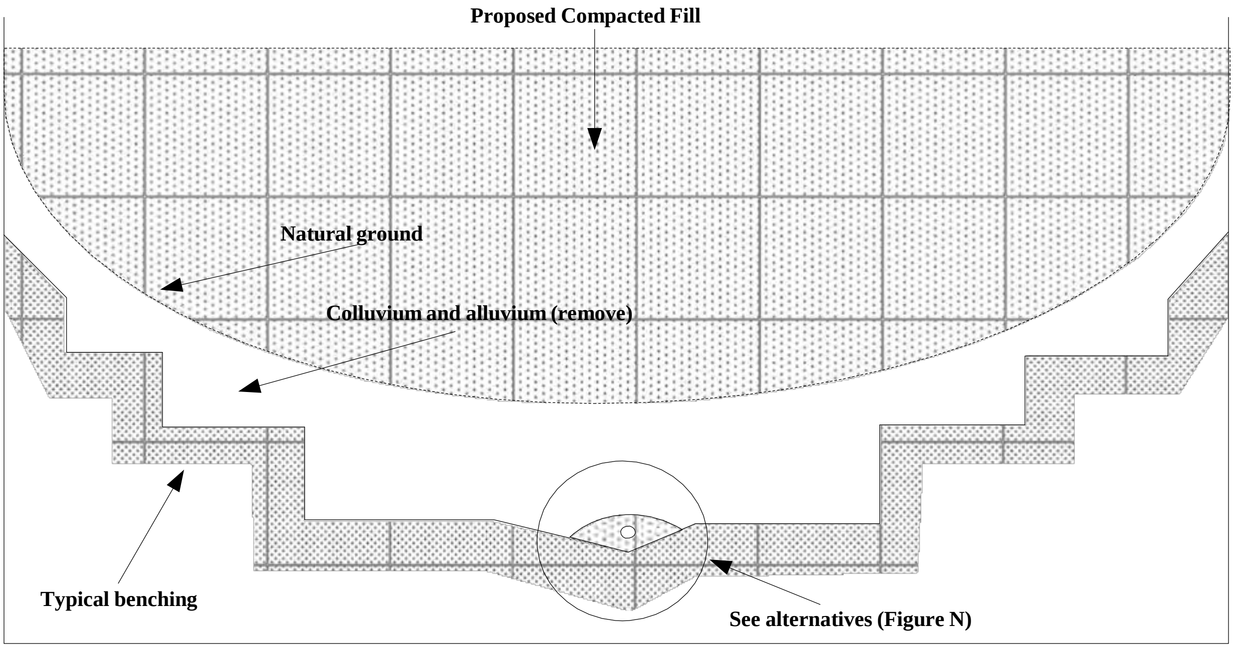
EARTHWORK AND GRADING GUIDELINES
OVERSIZE ROCK DISPOSAL

EEI
Engineering Solutions

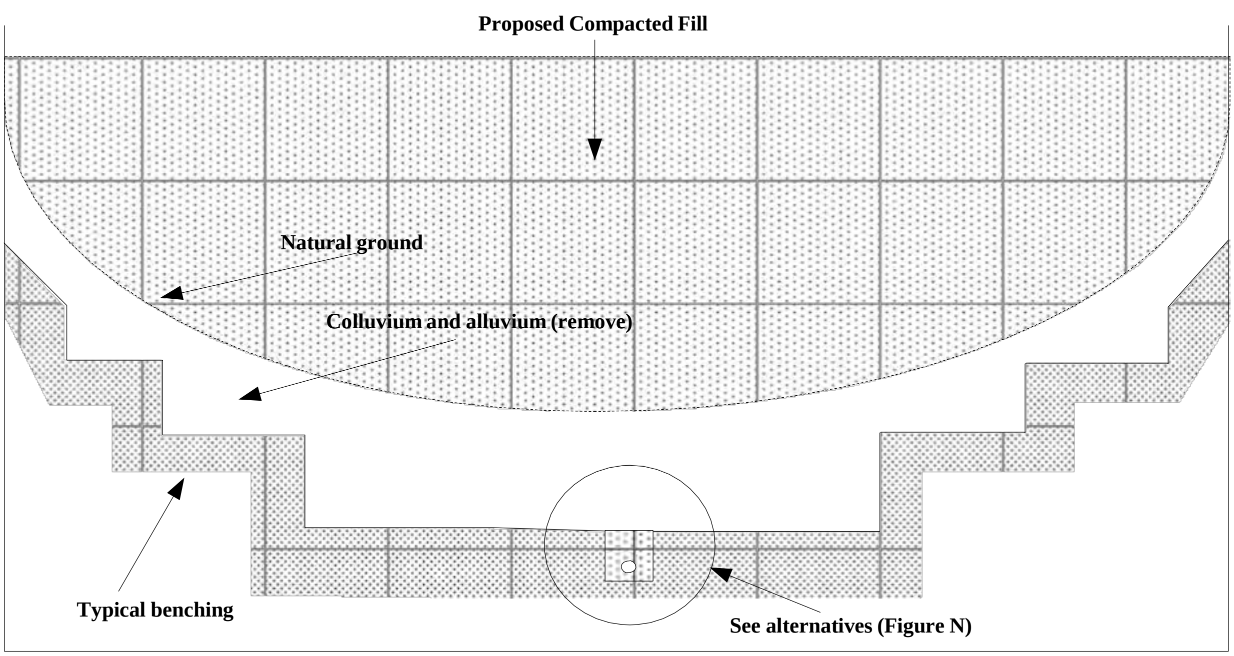
FIGURE L

CANYON SUBDRAIN DETAIL

Type A



Type B



Note: Alternatives, locations, and extent of subdrains should be determined by the soils engineer and/or engineering geologist during actual grading.

Note: Figures not to scale

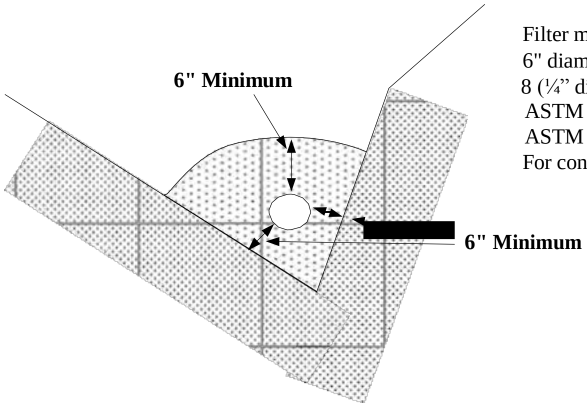
EARTHWORK AND GRADING GUIDELINES
CANYON SUBDRAIN DETAIL

EEI Engineering Solutions

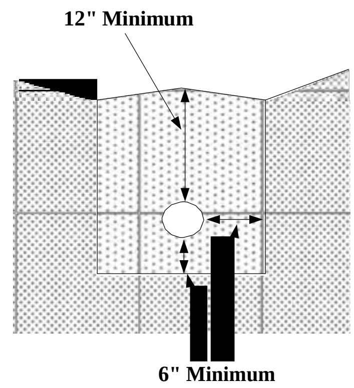
FIGURE M

CANYON SUBDRAIN ALTERNATE DETAILS

Alternate 1: Perforated Pipe and Filter Material



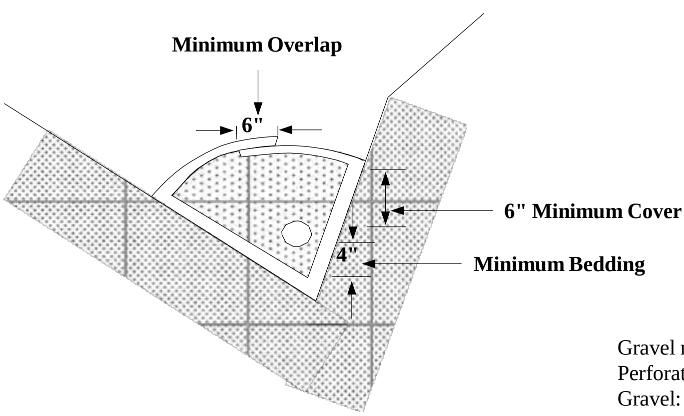
Filter material: Minimum volume of 9 feet^3/linear foot.
6" diameter ABS or PVC pipe or approved substitute with minimum 8 (¼" diameter) perforations per linear foot in bottom half of pipe.
ASTM D 2751, SDR 35 or ASTM D 1527, Schedule 40.
ASTM D 3034, SDR 35 or ASTM D 1785, Schedule 40.
For continuous run in excess of 500 feet use 8" diameter pipe.

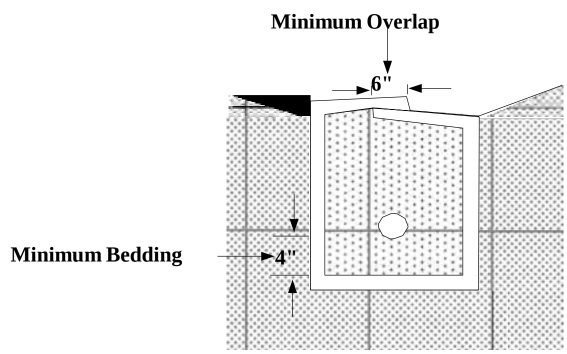


Filter Material

Sieve Size	Percent Passing
1"	100
¾"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

Alternate 2: Perforated Pipe, Gravel and Filter Fabric





Gravel material 9 feet^3/linear foot.
Perforated pipe: see alternate 1.
Gravel: Clean ¾" rock or approved substitute.
Filter Fabric: Mirafi 140 or approved substitute.

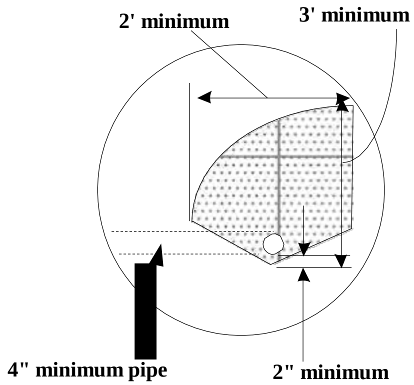
Note: Figures not to scale

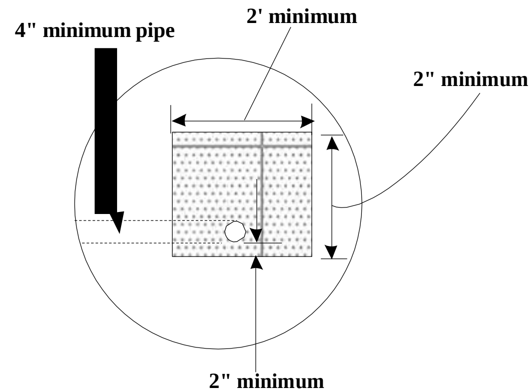
EARTHWORK AND GRADING GUIDELINES
CANYON SUBDRAIN ALTERNATE DETAILS

EEI
Engineering Solutions

FIGURE N

TYPICAL STABILIZATION BUTTRESS SUBDRAIN DETAIL





Filter Material: Minimum of 5 ft^3/linear foot of pipe or 4 ft^3/linear foot of pipe when placed in square cut trench.

Alternative In Lieu Of Filter Material: Gravel may be encased in approved filter fabric. Filter fabric shall be mirafi 140 or equivalent. Filter fabric shall be lapped a minimum of 12" on all joints.

Minimum 4" Diameter Pipe: ABS-ASTM D-2751, SDR 35 or ASTM D-1527 schedule 40 PVC-ASTM D-3034, SDR 35 or ASTM D-1785 schedule 40 with a crushing strength of 1,000 pounds minimum, and a minimum of 8 uniformly spaced perforations per foot of pipe installed with perforations at bottom of pipe. Provide cap at upstream end of pipe. Slope at 2% to outlet pipe. Outlet pipe shall be connected to the subdrain pipe with tee or elbow.

Note: (1) Trench for outlet pipes shall be backfilled with onsite soil.
(2) Backdrains and lateral drains shall be located at the elevation of every bench drain. First drain shall be located at the elevation just above the lower lot grade. Additional drains may be required at the discretion of the soils engineer and/or engineering geologist.

Filter Material – Shall be of the following specification or an approved equivalent:

Filter Material

Sieve Size	Percent Passing
1"	100
¾"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

Gravel - Shall be of the following specification or an approved equivalent:

Filter Material

Sieve Size	Percent Passing
1½"	100
No. 4	50
No. 200	8

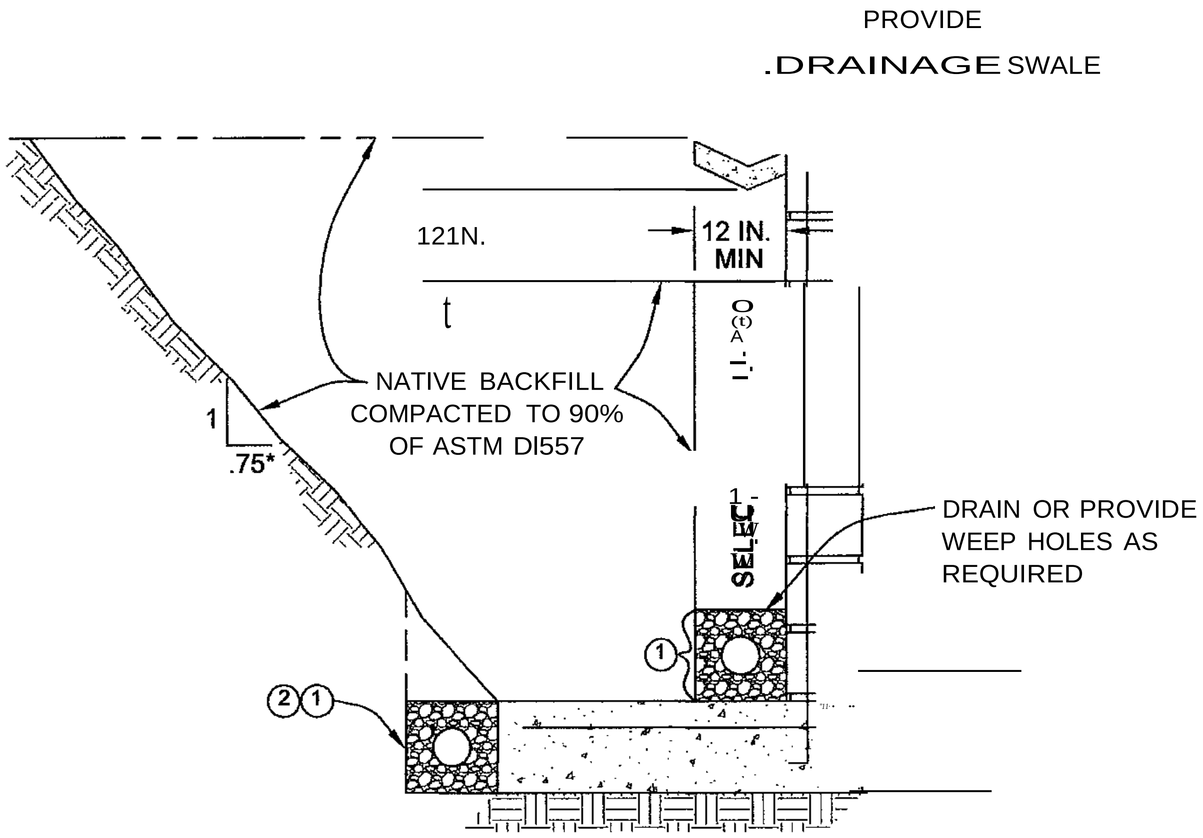
Sand equivalent: Minimum of 50

Note: Figures not to scale

EARTHWORK AND GRADING GUIDELINES
TYPICAL STABILIZATION BUTTRESS SUBDRAIN DETAIL

EEI
Engineering Solutions

FIGURE O



* OR AS REQUIRED FOR SAFETY

NOTES

(!) 4-INCH PERFORATED PVC SCHEDULE 40 OR APPROVED ALTERNATE. PLACE PERFORATION DOWN AND SURROUND WITH A MINIMUM OF 1 CUBIC FOOT PER LINEAL FOOT (1 FT. /FT.) OF 3/4 INCH ROCK OR APPROVED ALTERNATE AND WRAPPED IN FILTER FABRIC.

® PLACE DRAIN AS SHOWN WHERE MOISTURE MIGRATION THROUGH THE WALL IS UNDESIRABLE.

NOTE: FIGURE NOT TO SCALE

EARTHWORK & GRADING GUIDELINES

TYPICAL RETAINING WALL BACKFILL

EEI

Engineering Solutions

FIGURE P

APPENDIX C

Phase 1 Site Assessment

LGC GEO-ENVIRONMENTAL, INC.

PHASE I ENVIRONMENTAL SITE ASSESSMENT, FOR THE RESIDENTIAL DEVELOPMENT (APN 169-562-01-00), LOCATED AT 4000 MYSTRA WAY, CITY OF OCEANSIDE, SAN DIEGO COUNTY, CALIFORNIA

Dated: June 19, 2017
Project No. G17-1498-15

Prepared For:

Mr. Greg Spiro
PROTEA SENIOR LIVING OCEANSIDE, LLC
18 Ventana Ridge Drive
Aliso Viejo, California 92656

27570 Commerce Center Drive, Suite. 128, Temecula, California 92590
Phone: 951.297.2450 | Fax: 951.719.2998 | www.lgcgeoenv.com

June 19, 2017

Project No. G17-1498-15

Mr. Greg Spiro
PROTEA SENIOR LIVING OCEANSIDE, LLC
18 Ventana Ridge Drive
Aliso Viejo, California 92656

Subject: ***Phase I Environmental Site Assessment, for the Residential Development (APN 169-562-01-00), Located at 4000 Mystra Way, City of Oceanside, San Diego County, California.***

INTRODUCTION

LGC Geo-Environmental, Inc. (LGC) is pleased to submit herewith our Phase I Environmental Site Assessment (ESA) report, for the proposed Residential Development (APN 169-562-01-00), located at 4000 Mystra Way, City of Oceanside, San Diego County, California. Our study was performed in accordance with American Society for Testing and Materials (ASTM) Designation E1257-13.

This report presents the results of our site visit, review of previous reports, historical review, regulatory records review, and other information detailed within this report.

This assessment has been performed for the exclusive use and benefit of the addressee identified on the cover of this report, or agents directly specified by it, for the transaction at issue concerning the subject property described in this report. This assessment shall not be used or relied upon by others without the prior written consent of LGC, and of the addressee named on the cover of this report. We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in ASTM E1527-13.

The objective of this Phase I ESA was to ascertain the potential presence or absence of recognized environmental conditions (REC's) that could impact the subject property, as delineated in the scope of services and limitations identified in this report and in the service agreement. The procedure was to perform reasonable steps in accordance with the existing regulations, currently available technology, and generally accepted environmental consulting practices, in order to accomplish the stated objective.

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report. The surface observations made are believed representative of the entire project; however, sub-surface soil and geologic conditions may be different from our preliminary findings. If this occurs, the changed conditions must be evaluated by the project soils engineer and geologist for alternative recommendations.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control.

CLOSING

It has been a pleasure to be of service to you on this project. Should you have any questions, regarding the content of this report or should you require additional information, please do not hesitate to contact this office at your earliest convenience.

Respectfully submitted,

LGC GEO-ENVIRONMENTAL, INC.

Robert L. Gregorek, II 1357
Certified Engineering Geologist/Environmental Reviewer

REGISTERED GEOLOGIST
ROBERT L. GREGOREK II
No. 1257
CERTIFIED ENGINEERING GEOLOGIST
Exp. 8/31/17
STATE OF CALIFORNIA

KM/RG

Distribution: (3) Addressee

TABLE OF CONTENTS

Section ***Page***

LIST OF FIGURES AND APPENDICES

Figures

Appendices

EXECUTIVE SUMMARY

Overview - LGC Geo-Environmental, Inc. (LGC) was retained by Mr. Greg Spiro of Protea Senior Living Oceanside, LLC to perform a Phase I Environmental Site Assessment (Phase I ESA or Assessment) of APN 169-562-01-00, located on 4000 Mystra Way, City of Oceanside, San Diego County, California.

The purpose and scope of this Assessment was to make preliminary conclusions in regards to the potentiality for the presence of Recognized Environmental Conditions (REC's) within the subject site. REC's are defined as being the presence or likely presence of hazardous material releases within a property.

This Phase I ESA was performed in accordance with the scope and limitations of the *American Society for Testing and Materials (ASTM) Standard E1527-13.* The following summarizes LGC's independent conclusions and best professional judgment based upon information available to us during the course of this Assessment.

When making any decisions concerning the findings of this Assessment, please also refer to the remainder of this report, which may present other items of interest that are not discussed in the Executive Summary, or are further details regarding the items below.

Site Description – The subject site comprises approximately 2 acres in size. The property is essentially level with fill slopes on the west and south parameters of the property. The fill slopes are estimated to be about 4 feet to 8 feet in height. The site in currently vacant and has been previously graded. There are no structures present or visible indications of previous structures. Minor trash and debris, including some cans, concrete fragments, wood, leaves, grocery store wrappers and a discarded plastic pool cover. There is a sound wall on the north property line associated with the residential development. The site is bound on the west by Mystra Way, on the south by Cannon Road and the east by a private drive associated with the subject site.

Site Observations – Our site reconnaissance was conducted on June 7, 2017. At the time of our reconnaissance, some minor trash was observed, including the plastic pool cover. No pool cleaning products were observed with the pool cover.

Site Background – Based upon our review of the subject site and the aerial photos dating back to 1939, there appears to be no structures that were present on site. The site was previously graded around 1990 as a vacant parcel associated with the adjacent residential development to the north. By 1994 the grading on site and to the north is complete and about one-third of the residences appear constructed. Prior to 1990 there appears to be various presumably dirt road generally trending east-west across the site. Prior to 1964 the land appears to be mostly raw with minor elevation changes, light trees and brush, and a generally east-west trending natural drainage channel. Prior to 1953 there appears to be a minor presumably dirt roadway generally trending east-west.

Hazardous Material Sources Onsite – Underground storage tanks (UST's), clarifiers, sumps, and other structures that contain or house hazardous materials were not encountered during the assessment of the subject site.

Hazardous Material Releases Onsite – The potential for petroleum hydrocarbons and/or hazardous materials and chemicals was not encountered during the site reconnaissance and visual inspection.

Regional Hazardous Material Releases – During our background review of available documentation, we found no historical records of hazardous material or petroleum hydrocarbon releases or any other environmental risks in the general vicinity to have been recorded. Also, no facilities in the general vicinity are denoted by the Resource Conservation and Recovery Act (RCRA) of 1976 as small quantity generators (SQG's) of hazardous waste. SQG's generate between 100 kg and 1,000 kg of hazardous waste per month. Concern arises when these facilities are located geographically in such a way that a hazardous material released from those sites could migrate to the subject site.

Vapor Encroachment – Vapor encroachment concerns related to onsite conditions or nearby facilities do not exist on the subject site.

Recognized Environmental Conditions – No recognized environmental conditions were observed during the site reconnaissance and site assessment. Additionally, no historical REC's were identified through available documentation.

Recommendations – Based upon the limited site reconnaissance, historical review, regulatory records review, and other information detailed within this report and the appended reports, it is the recommendation of this firm that no additional environmental studies are necessary at the time of this study.

1.0 INTRODUCTION

1.1 Purpose

The purpose and scope of this Phase I Environmental Site Assessment (ESA) was to make preliminary conclusions in regards to the potentiality for the presence of Recognized Environmental Conditions (REC's) within the subject site at APN 169-562-01-00, located on 4000 Mystra Way, City of Oceanside, San Diego County, California.

REC's are defined as being the presence or likely presence of hazardous material releases or petroleum products within, on, or at a property (§1.1.1, ASTM E1527-13).

This ESA was performed in accordance with the scope and limitations of the *ASTM Designation E1527-13: Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.* The following summarizes LGC's independent conclusions and best professional judgment based upon information available to us during the course of this ESA.

1.2 Scope of Services

The following is a list of our services:

- Site reconnaissance in order to visually assess current onsite and adjoining property conditions and utilization.
- Locate and document the potential on site presence and possible use or storage or hazardous materials, in addition to any signs of surficial or subsurface contamination.
- Review of historic aerial photographs and topographic maps.
- Review of available reports and books previously prepared for the site.
- Review of the soil and groundwater conditions underlying the site.
- Review of available environmental and geologic maps which may have been prepared for the site.
- Review of state and federal environmental databases.
- Environmental analysis of data to address environmental issues relative to hazardous wastes associated with development.
- Review of agency files.

Data gaps to the ASTM Standard E1527-13 are as follows:

- Interviews with persons knowledgeable of the site.
- Access to the current site's purchase price and the fair market value.

2.0 SITE OVERVIEW

2.1 Location and Site Description

The subject site is located at APN 169-562-01-00, located on 4000 Mystra Way, City of Oceanside, San Diego County, California. The subject site comprises approximately 2 acres in size. The property is essentially level with fill slopes on the west and south parameters of the property. The site is bound on the west by Mystra Way, on the south by Cannon Road and the east by a private drive associated with the subject site. A Site Location Map is included at the rear of text (Figure 1).

2.2 Existing Improvements and Vegetation

There are on site improvements associated with the previous grading including fill slopes, utilities (within the right-of-way), and a private driveway near the east property line. The site in currently vacant and has been previously graded. The fill slopes are estimated to be about 4 feet to 8 feet in height. There are no structures present or visible indications of previous structures. Minor trash and debris, including some cans, concrete fragments, wood, leaves, grocery store wrappers and a discarded plastic pool cover. There is a sound wall on the north property line associated with the residential development. Some minor trash was observed, including the plastic pool cover. No pool cleaning products were observed with the pool cover. Onsite vegetation consists of several large trees near the southeast property line of the site and scattered brush throughout the entire site.

2.3 Historical Site Description

Based upon our review of the subject site and the aerial photos dating back to 1939, there appears to be no structures that were present on site. The site was previously graded around 1990 as a vacant parcel associated with the adjacent residential development to the north. By 1994 the grading on site and to the north is complete and about one-third of the residences appear constructed. Prior to 1990 there appears to be various presumably dirt road generally trending east-west across the site. Prior to 1964 the land appears to be mostly raw with minor elevation changes, light trees and brush, and a generally east-west trending natural drainage channel. Prior to 1953 there appears to be a minor presumably dirt roadway generally trending east-west.

2.4 Site Topography

The topography of the site is generally flat as a result of previous construction activities. The general elevation is approximately 387 feet above mean sea level (msl), ranging from approximately 375 feet msl in the west to 388 feet msl in the eastern portion.

2.5 Regional Geology

Regionally, the site is located in the Peninsular Ranges Geomorphic Province of California. The Peninsular Ranges are characterized by steep, elongated valleys that trend west to northwest. The northwest-trending topography is controlled by the Elsinore fault zone, which extends from the San Gabriel River Valley southeasterly to the United States/Mexico border. The Santa Ana Mountains lie along the western side of the Elsinore fault zone, while the Perris Block is located along the eastern side of the fault zone. The mountainous regions are underlain by Pre-Cretaceous, metasedimentary and metavolcanic rocks and Cretaceous plutonic rocks of the Southern California Batholith. Tertiary and Quaternary rocks are generally comprised of non-marine sediments consisting of sandstone, mudstones, conglomerates, and occasional volcanic units. Soils immediately underlying the site are described as being undocumented artificial fill, and alluvium. Bedrock material below the overlying soils generally consists of Quaternary age sandstones, metasediments and/or granitics.

2.6 Groundwater

Historical groundwater measurements were researched from the California Department of Water Resources water data library and the CASGEM GIS well search library did not show any well data within a practical distance to the site. The nearest well was identified as CASGEM Well number 332287N1172596W001 which was about 4.5 miles away. The historical groundwater depth recorded was approximately 18 feet below ground surface.

3.0 REVIEW OF ASSESSMENT OBSERVATIONS AND MATERIALS

3.1 Site Observations

Our site reconnaissance was conducted on June 7, 2017. The entire site was visually evaluated using a grid method spaced at approximately 75-foot intervals. Photo documentation occurred at each interval and any additional evidence of hazardous materials or possible contamination. The following is a list of our site observations made at the time of the investigation:

- At the time of this investigation, the subject site is a previously graded vacant pad with associated utilities within the right-of-way.
- No visible hazardous materials were observed on site.
- At the time of our reconnaissance, some minor trash was observed, including the plastic pool cover. No pool cleaning products were observed with the pool cover.
- None of the following were located on site at the time of our investigation:
    - Ports or vent pipes to underground storage tanks
    - Aboveground storage tanks
    - Visible septic systems (although possible onsite)
    - Wastewater discharge pipes
    - Unusual or noxious odors
    - Stained soils or evidence of petroleum products on standing waters
    - Surficial pools or ponding of potentially hazardous materials
    - No evidence of corrosion
    - No visible solid waste materials
    - No hydraulic or mechanical materials or waste containers

3.2 *Adjoining Property Observations*

As discussed in ASTM E1527-13, an adjoining property is any real property whose border is contiguous or partially contiguous with the subject property, or would be if the properties were not separated by a roadway, street or other public thoroughfare. For the purposes of this report, an adjacent property is any real property located within approximately one block or less of the subject property's border.

Specifically, the subject property is bordered by the following:

North: Residential Development

East: Residential Development

South: Cannon Roadway

West: Commercial Development

3.3 Aerial Photo Review

The following table identifies and summarizes the aerial photos that were made available and reviewed at the time of this reporting. These photos were reviewed for historical evidence of potentially hazardous usage, storage, and/or disposal locations on site. Potential hazardous indicators refer to potentially contaminant sources such as, but not limited to: landfills, oil well, storage drums, aboveground tanks, gas stations, agricultural operations known to use pesticides or herbicides, waste disposal pipes and disposal areas. Copies of the available aerial photographs can be found in Appendix C.

AERIAL PHOTO REVIEW	
Date	Observations
1939	The site appears as natural almost entirely undeveloped land with exception of an arcuate east-west trending dirt road that transects the property.
1946	The previous roadway appears to have been moved near the north property line.
1956	Some minor surficial grading appears near the previously mentioned roadway. No structures are visible.
1964	The previous dirt roadway is no longer visible and the north portion of the site now is covered with vegetation.
1967	An arcuate east-west trending dirt roadway is visible transecting the north portion of the site as a roadway to land development occurring to the west of the site.
1970	No change observed since 1967 photo.
1979	Land development involving sheet grading and associated roadways is occurring to the north and east of the site.
1985	Cannon Road is build. Resident Tract development is under construction to the south and east of the site.
1989	Additional residences to the east and south are constructed.
1990	The subject site and adjacent parcels to the west and north and sheet graded.
1994	The grading on site and to the north is complete and about one-third of the residences appear constructed.
2005	The subject parcel is vacant and grading operations to the west, north and south appears essentially complete.
2009	Minor recreational tire ruts are visible on site.
2010	Site appears unchanged since 2009 photo.
2012	Site appears to be stripped of vegetation. Possible remedial grading has taken place.
2014	Site appears the have increased vegetation and some recreational tire ruts.
2016	Site appears to have less vegetation since 2014 photo.

3.4 Historical Topography Maps

The following table identifies and summarizes the historical topography maps that were made available and reviewed at the time of this reporting. These maps were reviewed for historical evidence of potentially hazardous usage, storage, and/or disposal locations on site. Potential hazardous indicators refer to potentially contaminant sources such as, but not limited to: landfills, oil well, storage drums, aboveground tanks, gas stations, agricultural operations known to use pesticides or herbicides, waste disposal pipes and disposal areas. Copies of the available historical topography maps can be found in Appendix C.

HISTORICAL TOPOGRAPHY MAP REVIEW	
Date	Observations
1893	The site is shown in the "Cerro de la Calavera" area of Oceanside. The site is about 400 feet above mean sea level.
1898	No change apparent since 1893.
1901	No change apparent since 1901.
1947	Several roadways are now visible throughout the area. There is an arcuate east-west trending roadway near the north property line of the subject site.
1948	Increased roadways and residential development to the far north of the subject site.
1949	A small presumably manmade body of water is mapped on the north portion of the site.
1968	The body of water is no longer mapped on site. There is a water tank to the north by San Francisco Peak. Residential development has heavily increased to the north.
1975	Indicates increased commercial development northwest of site near Rancho California airport. Interstate 15 shown as Divided Freeway.
1996	Extensive street and roadway development indicated throughout the area. Cannon road and the residential development to the north and east is mapped.
1997	Same as 1996 photo.
2012	Some additional roadway and residential development since 1997 photo.

3.5 Sanborn Insurance Maps

Sanborn Fire Insurance Maps were researched within a 1 mile radius around the subject site to be reviewed for this study. No Sanborn Fire Insurance Maps were available for the subject site and/or the surrounding area.

3.6 Assessor Parcel Maps

Assessor parcel maps were obtained for review during the assessment of the subject site. Additionally, a current property profile was also obtained. The subject site is currently listed under the following Assessor Parcel Numbers (APN's): 922-043-002, 003, 004, 015, and 018. The current title is vested in Temecula Hotel Partners Old Town LLC, which received the title from the John R. and Christina A. McCusker Trustees. Owners that are currently or who were previously associated with hazardous material use, including fuel stations or dry cleaners, were not listed in the profile of the subject site.

3.7 Prior Assessment Reports

Based on research and data obtained, no prior Phase I ESA's could be located for the subject site.

3.8 Environmental Database Review

In reviewing all available environmental databases, Environmental Data Resources, Inc. (EDR) was utilized to conduct an exhaustive search of available environmental records and resources for the subject site. In EDR's search, a radius of up to 1 mile from the subject property was used to meet the specific requirements of ASTM Designation E1527-13 including specific search distances and data currency. Included in the EDR inquiry was governmental databases for records review. A copy of EDR's exhaustive report, dated June 07, 2017, can be found in Appendix D, in the Government Records Searched and Data Currency Tracking section at the end of the report describe the databases that were utilized along with a brief description and the most current date available of the database.

Within the EDR report, sites that are located within a governmental database are generally described within the report. As noted in this report, there are no adjacent or adjoining properties within a 1 mile search radius from the subject property that either possess the potential for hazardous material releases or have released hazardous materials to the soil or groundwater in the past. There is some potential for these properties to negatively impact the subject site, specifically those sites that are higher in elevation or are up gradient of the subject site. However, there are no properties up-gradient and within 1/3 of a mile from the subject site so there is very little possibility of hazardous material encroachment due to flooding, or vapor encroachment onto the subject site.

3.9 *Agency Contact and Database Search*

Any environmental records for the subject site and the surrounding area were obtained from the following:

- California Division of Oil, Gas, and Geothermal Resources
- California Regional Water Quality Control Board
- California Department of Toxic Substances Control
- South Coast Air Quality Management District

Each respective database is summarized, including any findings, in the following subsections.

3.9.1 *California Division of Oil, Gas, and Geothermal Resources*

Oil and gas well maps found on the California Division of Oil, Gas, and Geothermal Resources, otherwise known as DOGGR, were analyzed for any active and inactive wells. The online resource can be found at http://maps.conservation.ca.gov/doggr/. After reviewing the provided map by the DOGGR, there are no oil and gas wells located within the site or within 1 mile of the site.

3.9.2 *Regional Water Quality Control Board*

The Regional Water Quality Control Board (RWQCB) database and records were searched for leaking underground storage tank cleanup sites (LUST's), cleanup program sites, land disposal sites, military sites, WDR sites, irrigated lands regulatory program sites, and permitted underground storage tank facilities (UST's). Any properties that are listed as any of these sites will be depicted on the online map resource found at http://geotracker.swrcb.ca.gov. None of the above mentioned were located within 1 mile of the site.

3.9.3 *South Coast Air Quality Management District*

Public information and databases available online from the South Coast Air Quality Management District (AQMD) were searched and reviewed relative to the subject site. The information reviewed is available at http://www.aqmd.gov. The information presented on the AQMD database contains any facilities that possess a permit from the AQMD. No AQMD permitted sites were identified during our study.

3.9.4 *Department of Toxic Substances Control*

The Department of Toxic Substances Control (DTSC) online database Envirostor was searched and reviewed relative to the subject property. The DTSC online database can be found at http://www.envirostor.dtsc.ca.gov/. The database from the DTSC is used to find documented Federal Superfund, State Response, Voluntary Cleanup, School Cleanup, Evaluation, School Investigation, Military Evaluation, Tiered Permit, and Corrective Action cleanup sites. After reviewing the DTSC database, no facilities within approximately 1 mile of the subject site were identified.

4.0 FINDINGS

4.1 Building Construction Materials

Any building construction materials that could be cause for the presence of hazardous materials or asbestos-containing building materials and lead-based paints were considered during this assessment. Due to the lake of present or historical structures hazardous building construction materials are not considered an environmental issue for the subject site.

4.2 Onsite Hazardous Material Use

4.2.1 Pesticides and Herbicides

Our records and photo research did not discover evidence of any commercial pesticide or herbicide usage.

4.2.2 Chemical/Petroleum Hydrocarbon Materials

Records and visual evidence indicating potentially hazardous chemical/petroleum hydrocarbon use on the subject site was not encountered during this assessment and review of all available documentation.

4.2.3 Hazardous Materials Storage Structures

Evidence for the presence or previous presence of Aboveground Storage Tanks (AST's), Underground Storage Tanks (UST's), sumps, clarifiers, and any other hazardous material storage or treatment structures was not discovered during the visual assessment of the subject site and was not encountered during our records review.

4.2.4 Regulatory Actions

There are no known regulatory actions, specifically in regards to hazardous materials cleanup that were issued or are being issued for the subject site.

4.3 Subject Site Vicinity

4.3.1 Landfills

Landfills and hazardous waste facilities are not known to exist within a 1 mile radius of the subject site.

4.3.2 Regional or Adjacent Hazardous Material Releases

Regional releases of hazardous material, or large-scale releases, are recorded on the National Priority List (NPL). No NPL sites are reported within 1 mile of the subject site.

4.3.3 Radon

Radon levels for the subject site and surrounding areas are reported to be less than 2 picocuries per liter (pCi/L), which is considered "low potential". The EPA minimum action level is set at 4.0 pCi/L. The online database can be found at http://www.city-data.com/radon-zones/California/California.html.

4.3.4 Asbestos

A single asbestos-containing rock site is noted to be within San Diego County, but is not known to exist within 15 miles of the subject site. A map of historic asbestos mines and natural occurrences can be seen at ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ms/59/MS59_Plate.pdf.

4.3.5 Potable Water Source

The subject site, located within the City of Oceanside, is provided potable water from three sources; the San Diego County Water Authority (SDCWA), SDCWA water which is treated at Robert A. Weese Water Treatment Plant, and lastly Mission Basin Desalting Facility. The City of Oceanside Water Quality Report from 2016 reports that Oceanside's drinking water meets or exceeds all state and federal health standards for water quality.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 Site Background

Historical uses of the subject site were assessed primarily through historical aerial photographs and records review. Aerial photographs were collected as far back as 1939. The site appears to have been graded around 1990 as part of the residential development to the north. The site has remained vacant since then.

5.1.2 Onsite Hazardous Material Sources

Visual or physical evidence of AST's, UST's, sumps, clarifiers, and any other hazardous material storage or treatment structures was not discovered during the visual assessment of the subject site and was not encountered during our records review.

5.1.3 Onsite Hazardous Material Releases

Hazardous material releases of petroleum hydrocarbons and/or chemicals of concern were not evident during the site reconnaissance or during our records review. Based on our research and the aerial photographs reviewed since 1939, the subject site appears to have no operations which could possibly release potentially hazardous materials.

5.1.4 Regional Hazardous Material Releases

Based on our assessment, records review, and available documentation, no apparent threat of hazardous material releases, either past or present, exist for the subject site. Any hazardous material generators within the vicinity are at a lower elevation than the subject site and do not pose a potential threat to the property.

5.1.5 Recognized Environmental Conditions

Recognized environmental conditions, or REC's, were not identified for the subject site. This was concluded upon the visual inspection of the property, records review, and aerial photograph review.

5.2 Recommendations

Additional environmental studies are not recommended for the site at this time. This recommendation is founded on our site observations, records review, aerial photograph review, and all available documentation, all of which suggest there are no known onsite conditions or any suspected conditions based on the information available that would warrant the involvement of a regulating agency, including any conditions or actions that would necessitate environmental soil sampling, soil contamination remediation, and/or groundwater contamination remediation.

6.0 LIMITATIONS

This Phase I Environmental Site Assessment was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers, geologists, and environmental professionals practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report. The current observations made in the field, records review, aerial photograph review, and all available documentation is believed to be representative of the entire project; however, soil and geologic conditions revealed by excavation may be different from our preliminary findings. If this occurs, the changed conditions must be evaluated by the environmental professional and the recommendations within this assessment are subject to change. Changes in the conditions of a property can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are adhered to and made clear.

The conclusions and opinions contained in this assessment are based on the results of the described records review and available documentation and represent our professional judgment.

The conclusions and recommendations contained in this assessment are valid up to a period of 1 year from the date of this report (All Appropriate Inquiries [AAI] Final Rule). Changes in the conditions of a property can and do occur with the passage of time, whether those be because of natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate codes or standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this assessment may be invalidated wholly or partially by changes outside LGC's control. Therefore, if any of the above mentioned situations occur, an update of this report must be completed.

This report has not been prepared for use by parties or projects other than those named or designed above. It may not contain sufficient information for other parties or other purposes. LGC reserves the right to the information, conclusions, recommendations, and findings of this assessment should the client decide to forfeit their ownership of the subject property.

The opportunity to be of service is appreciated. Should you have any questions regarding the content of this assessment, or should you require additional information, please do not hesitate to contact this office at your earliest convenience.

FIGURE 1
SITE LOCATION MAP

Project Name	4000 MYSTRA WAY
Project No.	G17-1498-15
Geol./ Eng.	RLG
Scale	NOT TO SCALE
Date	JUNE 2017

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos,* dated August 2000.

CASGEM Water Data Library, 2017, https://www.casgem.water.ca.gov/OSS/(S(xyeqei3lhbz1j4mpojeipb3z))/GIS/PopViewMap.aspx?Public=Y, Search Date: June 19.

City of Oceanside, 2017, 2016 Water Quality Report, http://www.ci.oceanside.ca.us/civicax/filebank/blobdload.aspx?BlobID=44987, Search Dated June 19.

Environmental Data Resources, Inc., 2017, "Premium Package", Inquiry 4958705.2s, dated June 7.

Environmental Data Resources, Inc., 2017, EDR VEC App, https://www.web.edrnet.com/ordering/lightbox/vecapp.html?pguid=115048f1-7796-4146-980f-565562e9f5b1, Search Date: June 19.

United States Geological Survey, 1979, *Geologic Map of the Oceanside 30' x 60' Quadrangle, California*, Scale = 1:100,000, Compiled by Michael P. Kennedy and Siang S. Tan.

APPENDIX B

SITE PHOTOGRAPHS

Photo No. 1 – View East, Walking North Property Boundary

Photo No. 2 – View South, Walking North Property Boundary

Photo No. 3 – View South, Continuing East along North Property Boundary

Photo No. 4 – View East, Continuing East along North Property Boundary

Photo No. 5 – Pool Tarp, Located Along North Property Boundary

Photo No. 6 – View South, Near Northeast corner. Private Drive and Minor Recreational Tire Ruts Visible

Photo No. 7 – View South, Near East Property Boundary

Photo No. 8 – View West, Near East Property Boundary


Photo No. 9 – View South, Near East Property Boundary


Photo No. 10 – View West, Near Southeast Corner of Property

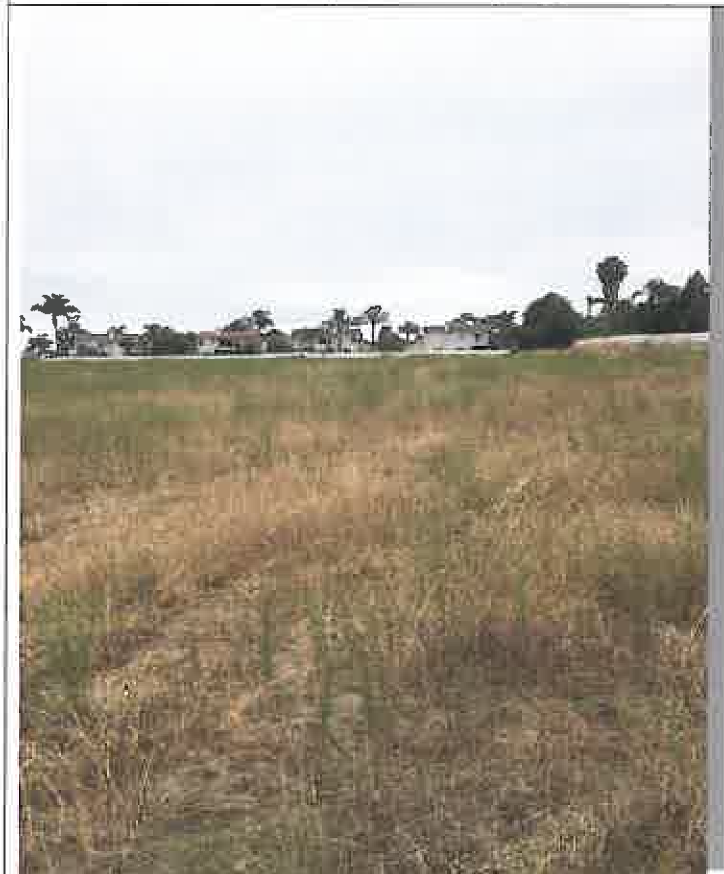


Photo No. 11 – View North, Near South Property Boundary


Photo No. 12 – View West, Near South Property Boundary

Photo No. 13 – View North, Near Southwest Corner of Property Boundary

APPENDIX C

AERIAL PHOTOGRAPHS, TOPOGRAPHICAL MAPS, & ASSESSOR PARCEL MAPS

APN 169-562-01-00
4000 MYSTRA WAY
OCEANSIDE, CA 92056

Inquiry Number: 4958705.12
June 06, 2017

The EDR Aerial Photo Decade Package

EDR®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

06/06/17

Site Name:	Client Name:
APN 169-562-01-00	LGCGEOENV
4000 MYSTRA WAY	27570 Commerce Ctr Dr #128
OCEANSIDE, CA 92056	Temecula, CA 92590-2533
EDR Inquiry # 4958705.12	Contact: Kyle Mchargue

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2010	1"=500'	Flight Year: 2010	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2005	1"=500'	Flight Year: 2005	USDA/NAIP
1994	1"=500'	Acquisition Date: June 01, 1994	USGS/DOQQ
1990	1"=500'	Flight Date: September 06, 1990	USDA
1989	1"=500'	Flight Date: August 15, 1989	USDA
1985	1"=500'	Flight Date: September 13, 1985	USDA
1979	1"=500'	Flight Date: January 27, 1979	EDR Proprietary Landiscor
1970	1"=500'	Flight Date: March 06, 1970	EDR Proprietary Landiscor
1967	1"=500'	Flight Date: May 07, 1967	USGS
1964	1"=500'	Flight Date: April 09, 1964	USDA
1953	1"=500'	Flight Date: April 14, 1953	USDA
1946	1"=500'	Flight Date: December 30, 1946	USGS
1939	1"=500'	Flight Date: April 16, 1939	USDA

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

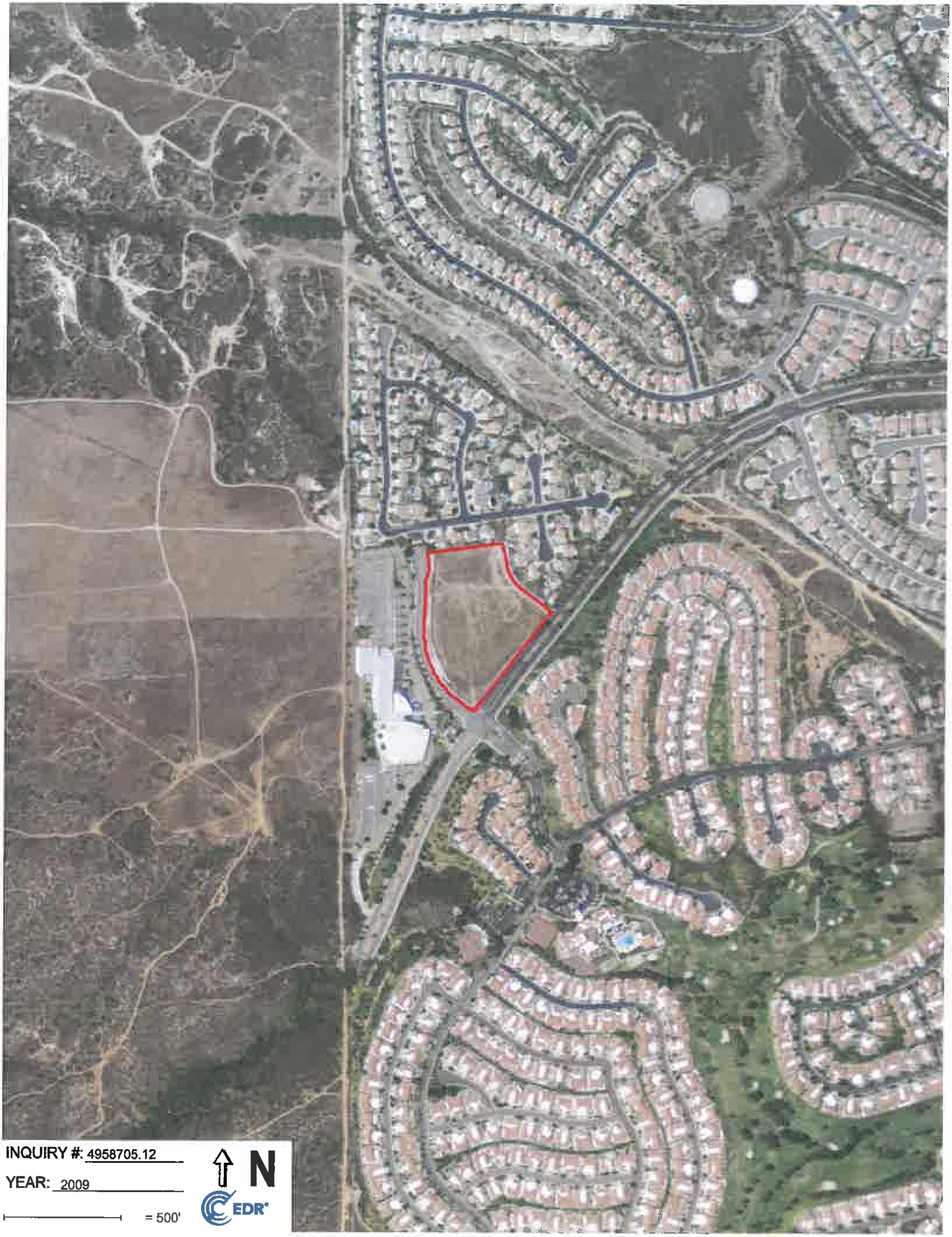
INQUIRY #: 4958705.12

YEAR: 2012

= 500'

N

INQUIRY #: 4958705.12
YEAR: 2010
N
= 500'
EDR

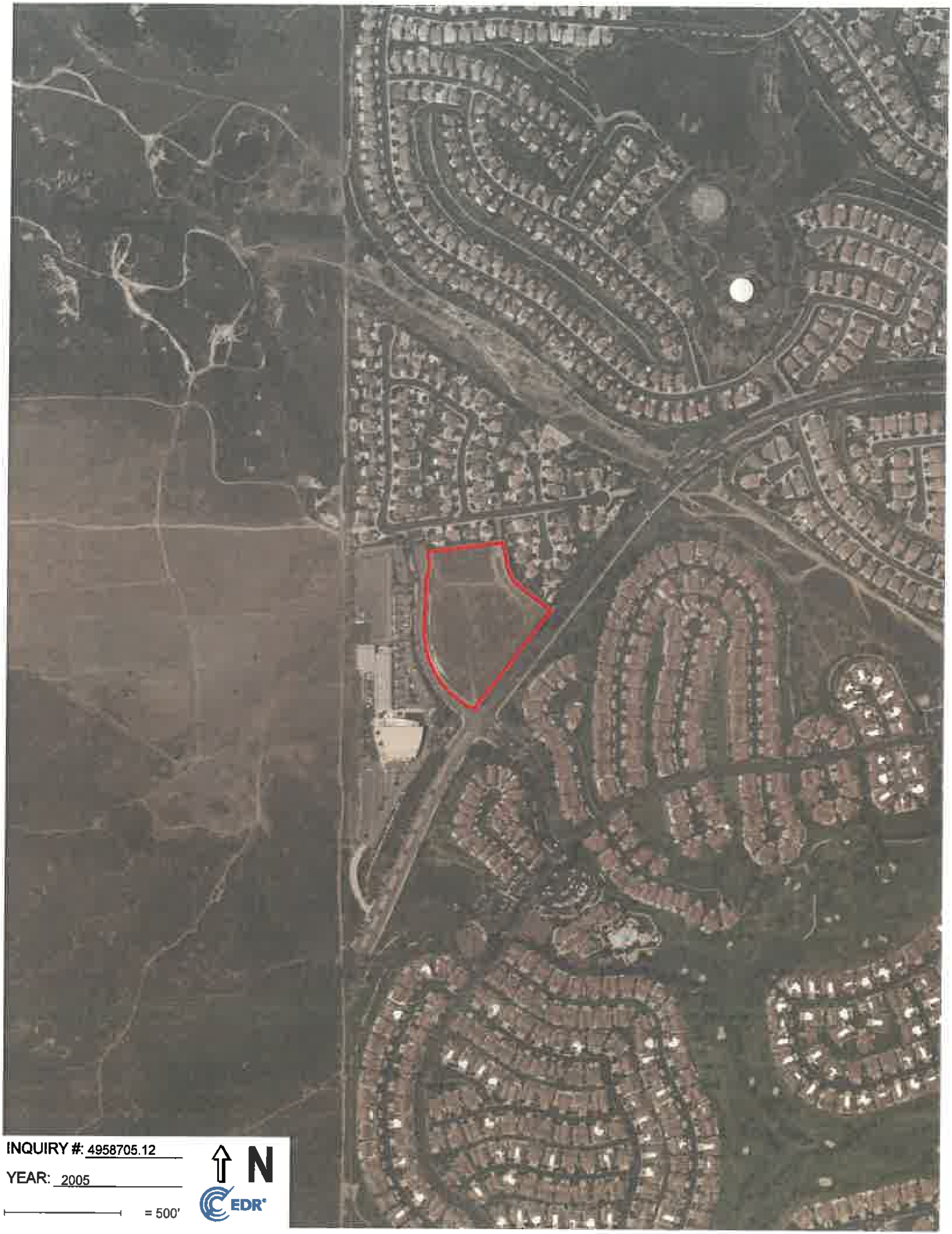


INQUIRY #: 4958705.12

YEAR: 2009

N

= 500'



INQUIRY #: 4958705.12

YEAR: 2005

= 500'

N

EDR

INQUIRY #: 4958705.12

YEAR: 1994

= 500'

N

EDR


INQUIRY #: 4958705.12
YEAR: 1990
= 500'
N
EDR

INQUIRY #: 4958705.12

YEAR: 1989

= 500'

N

INQUIRY #: 4958705.12

YEAR: 1985

= 500'

N

EDR

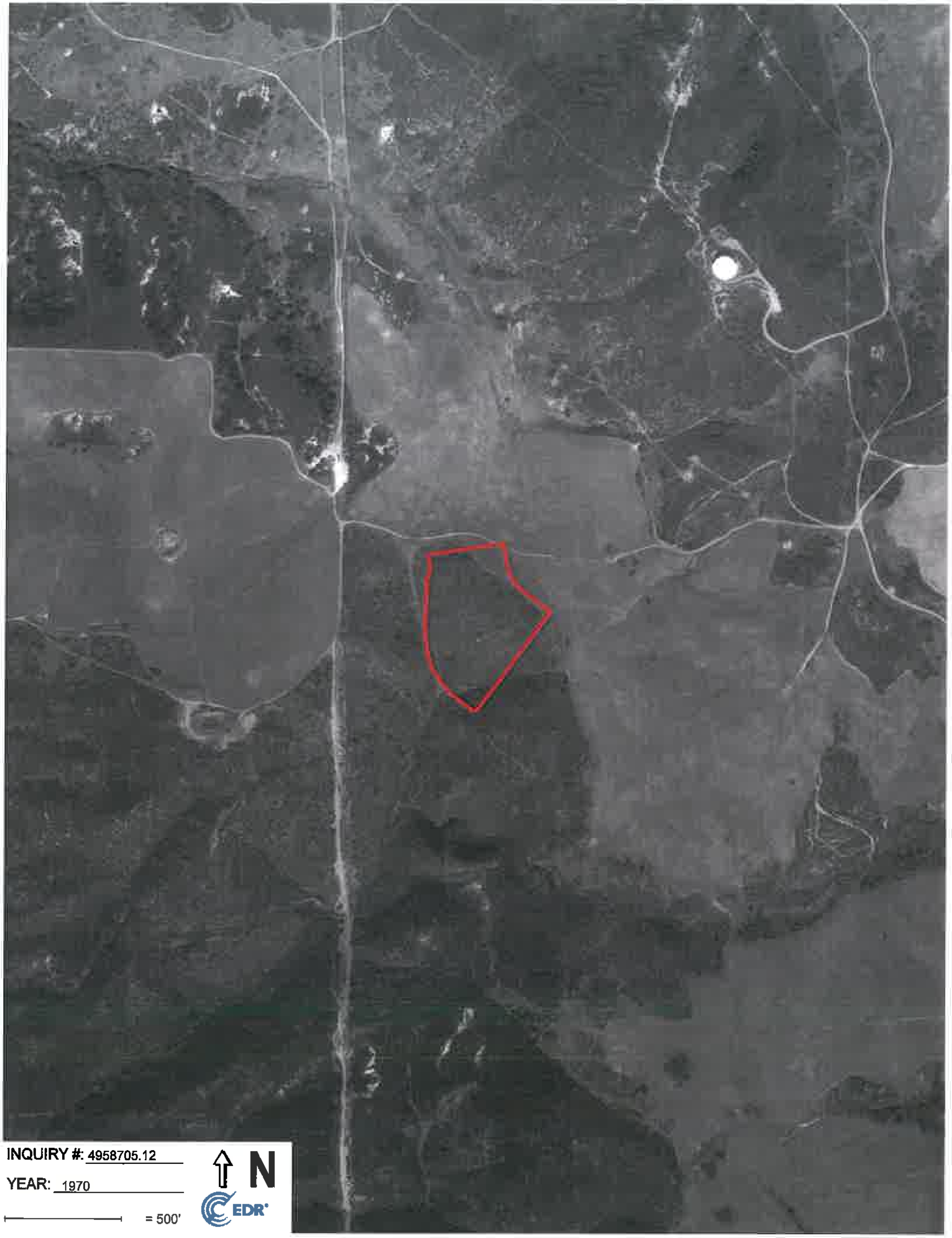
INQUIRY #: 4958705.12

YEAR: 1979

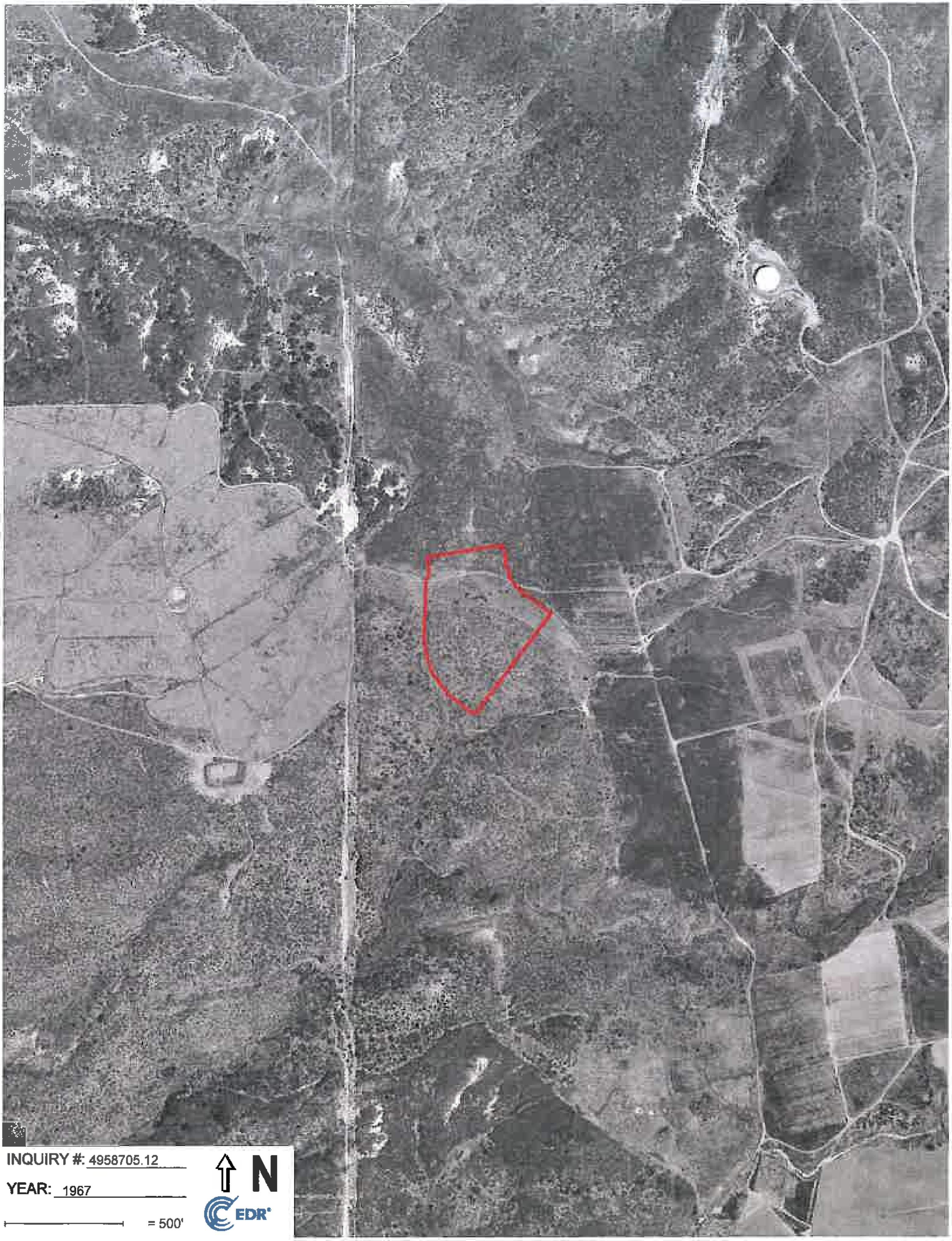
= 500'

N

EDR



INQUIRY #: 4958705.12
YEAR: 1970
N
= 500'
EDR



INQUIRY #: 4958705.12

YEAR: 1967

N

EDR

= 500'

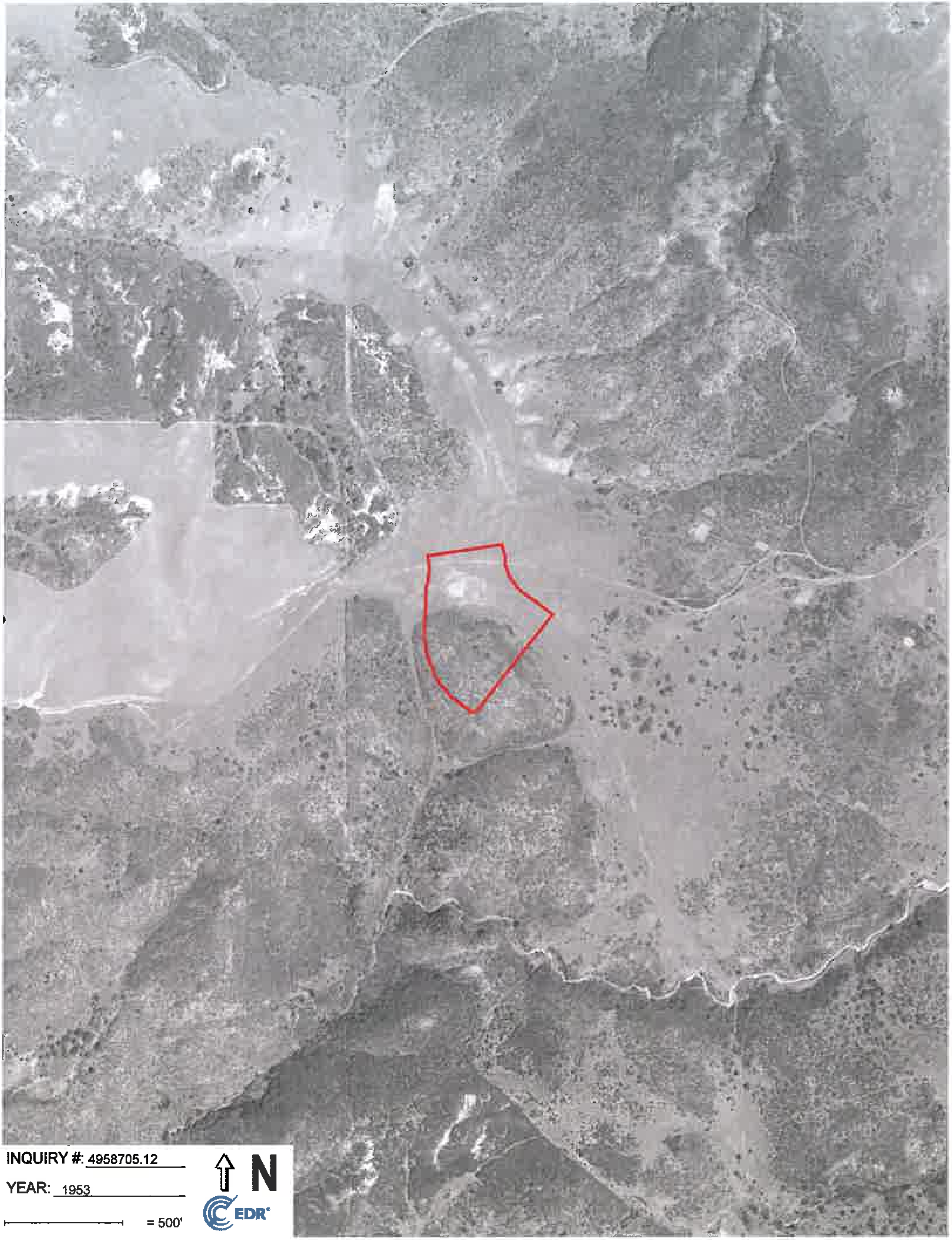
INQUIRY #: 4958705.12

YEAR: 1964

N

EDR

= 500'



INQUIRY #: 4958705.12

YEAR: 1953

= 500'

N

EDR

INQUIRY #: 4958705.12

YEAR: 1946

= 500'

N

EDR

INQUIRY #: 4958705.12

YEAR: 1939

= 500'

N

APN 169-562-01-00
4000 MYSTRA WAY
OCEANSIDE, CA 92056

Inquiry Number: 4958705.4
June 06, 2017

EDR Historical Topo Map Report

with QuadMatch™

EDR®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

06/06/17

Site Name:	Client Name:
APN 169-562-01-00	LGCGEOENV
4000 MYSTRA WAY	27570 Commerce Ctr Dr #128
OCEANSIDE, CA 92056	Temecula, CA 92590-2533
EDR Inquiry # 4958705.4	Contact: Kyle Mchargue

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by LGCGEOENV were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.#	G17-1498-15
Project:	APN 169-562-01-00

Coordinates:

Latitude:	33.165736 33° 9' 57" North
Longitude:	-117.268883 -117° 16' 8" West
UTM Zone:	Zone 11 North
UTM X Meters:	474929.10
UTM Y Meters:	3669692.88
Elevation:	395.76' above sea level

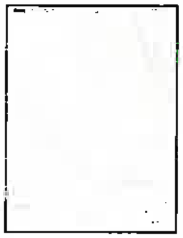
Maps Provided:

2012
1996, 1997
1975
1968
1949
1948
1947
1901
1898
1893

Topo Sheet Key

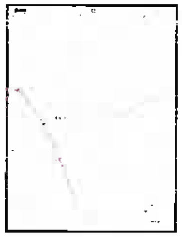
This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012 Source Sheets



San Marcos

7.5-minute, 24000



San Luis Rey

7.5-minute, 24000

1996, 1997 Source Sheets

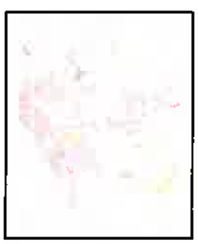
San Marcos

7.5-minute, 24000
Aerial Photo Revised 1996

San Luis Rey

7.5-minute, 24000
Aerial Photo Revised 1997

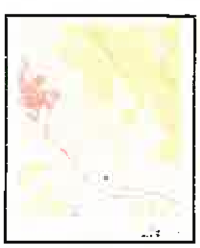
1975 Source Sheets



San Luis Rey

7.5-minute, 24000
Aerial Photo Revised 1975

1968 Source Sheets



San Marcos

7.5-minute, 24000
Aerial Photo Revised 1967

San Luis Rey

7.5-minute, 24000
Aerial Photo Revised 1967

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1949 Source Sheets


San Luis Rey

7.5-minute, 24000
Aerial Photo Revised 1946


San Marcos

7.5-minute, 24000
Aerial Photo Revised 1946

1948 Source Sheets


San Luis Rey

7.5-minute, 24000
Aerial Photo Revised 1946


San Marcos

7.5-minute, 24000
Aerial Photo Revised 1946

1947 Source Sheets

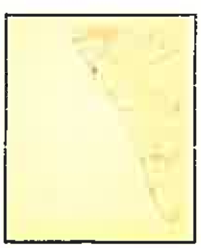

OCEANSIDE

15-minute, 50000


ESCONDIDO

15-minute, 50000

1901 Source Sheets


Oceanside

15-minute, 62500

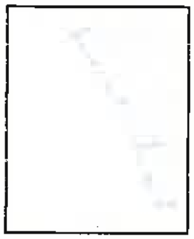

Escondido

15-minute, 62500

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

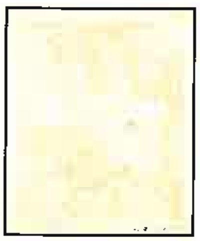
1898 Source Sheets



Oceanside

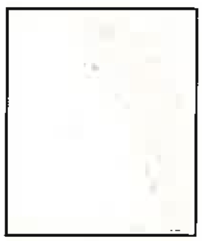
15-minute, 62500

1893 Source Sheets



Escondido

15-minute, 62500

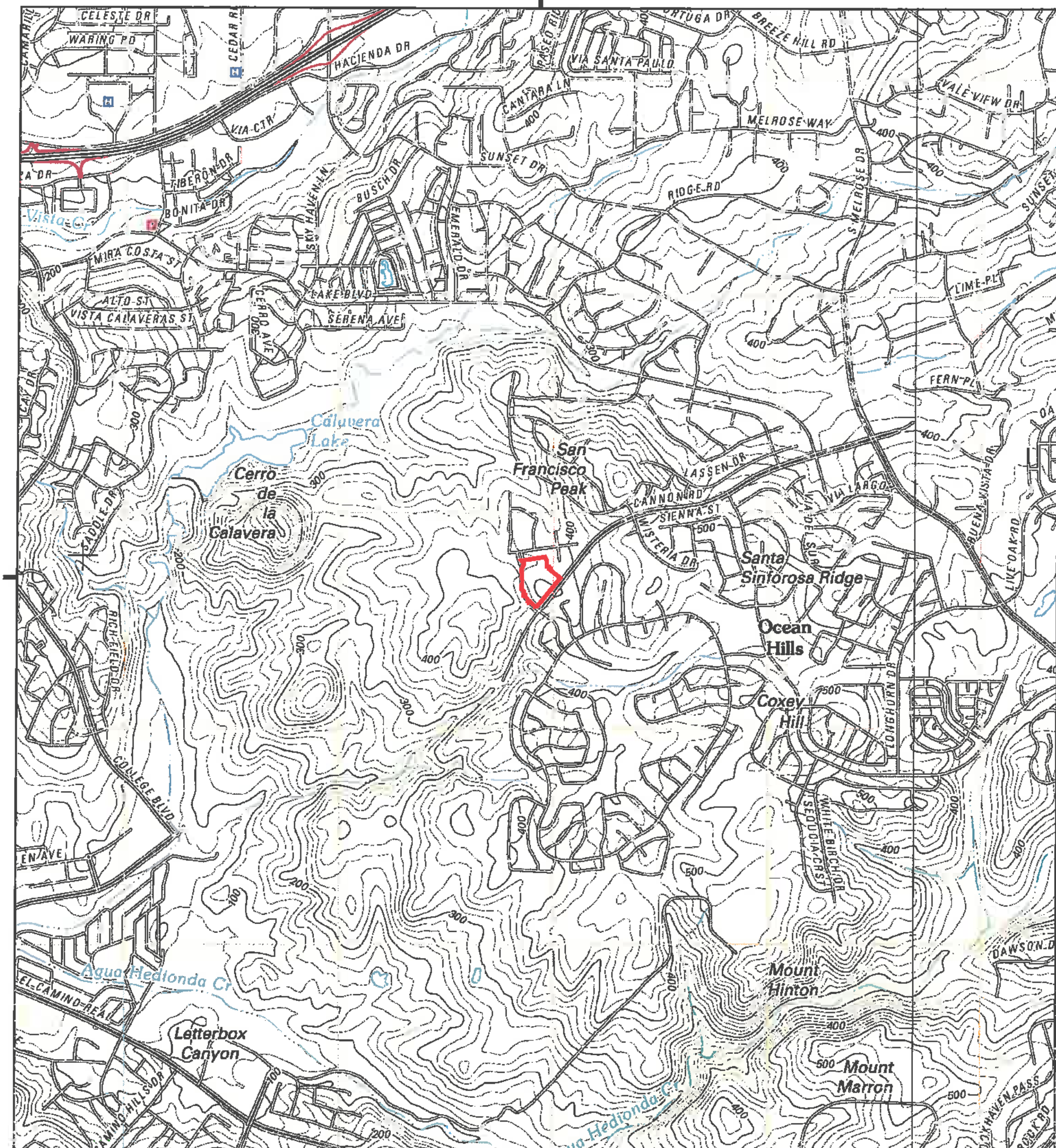


Oceanside

15-minute, 62500

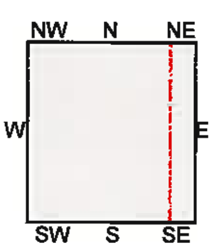
Historical Topo Map

2012



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



TP, San Luis Rey, 2012, 7.5-minute
E, San Marcos, 2012, 7.5-minute

SITE NAME: APN 169-562-01-00
ADDRESS: 4000 MYSTRA WAY
OCEANSIDE, CA 92056
CLIENT: LGCGEOENV

N

Historical Topo Map

1996, 1997

This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

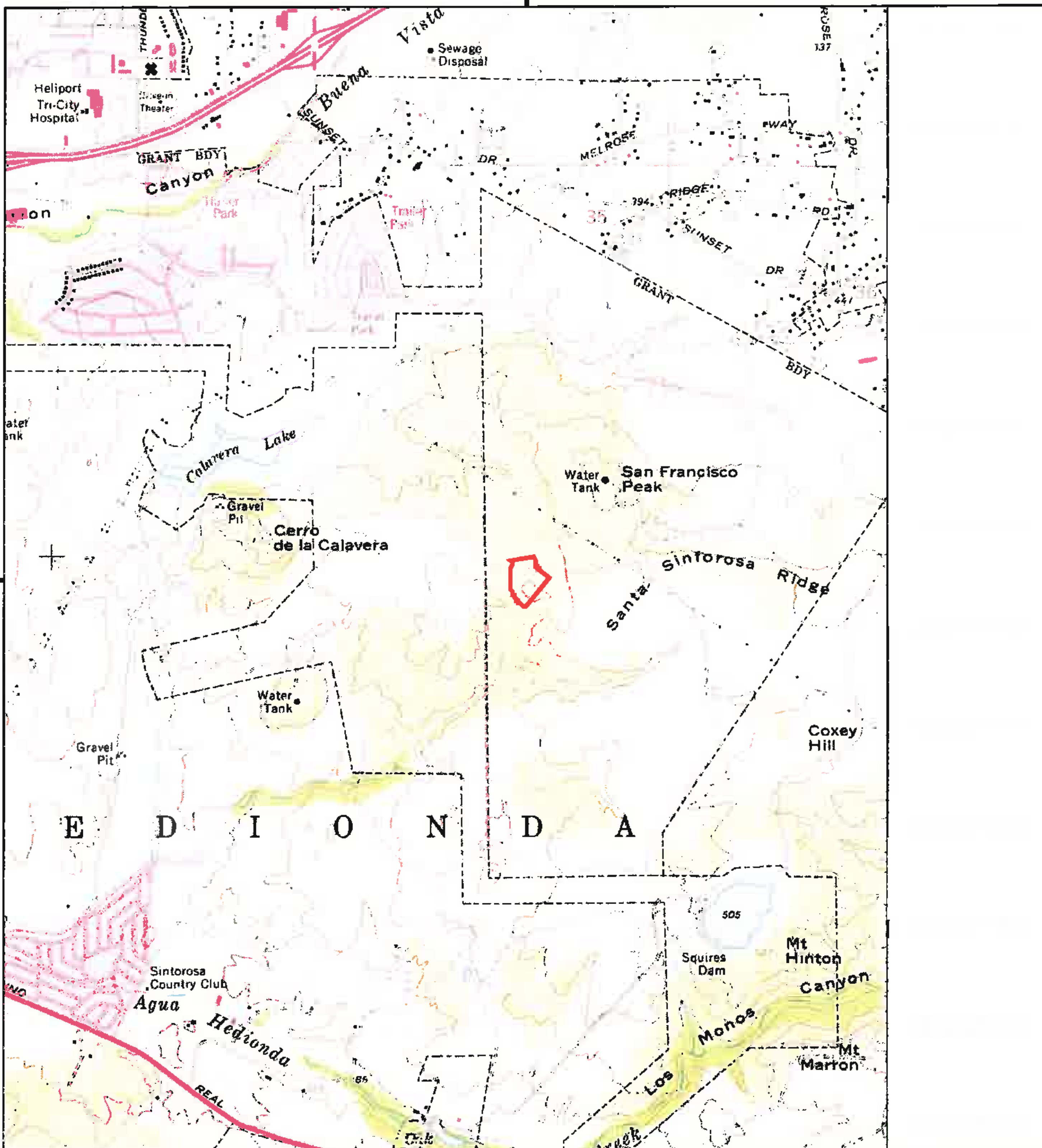
TP, San Luis Rey, 1997, 7.5-minute
E, San Marcos, 1996, 7.5-minute

SITE NAME: APN 169-562-01-00
ADDRESS: 4000 MYSTRA WAY
OCEANSIDE, CA 92056
CLIENT: LGCGEOENV

N

Historical Topo Map

1975



This report includes information from the following map sheet(s).

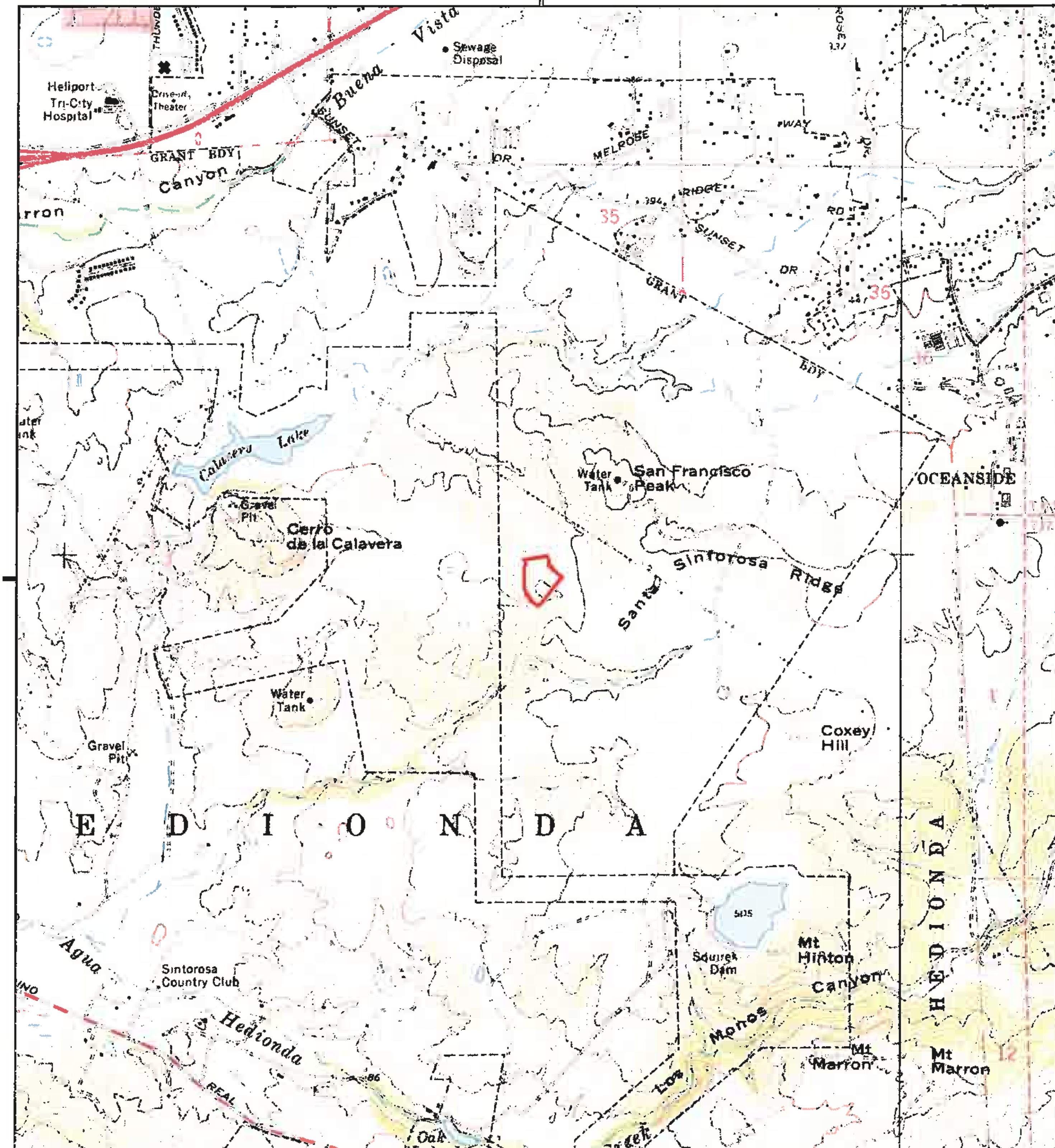
0 Miles 0.25 0.5 1 1.5

NW N NE W E SW S SE

TP, San Luis Rey, 1975, 7.5-minute

SITE NAME: APN 169-562-01-00
ADDRESS: 4000 MYSTRA WAY
OCEANSIDE, CA 92056
CLIENT: LGCGEOENV

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

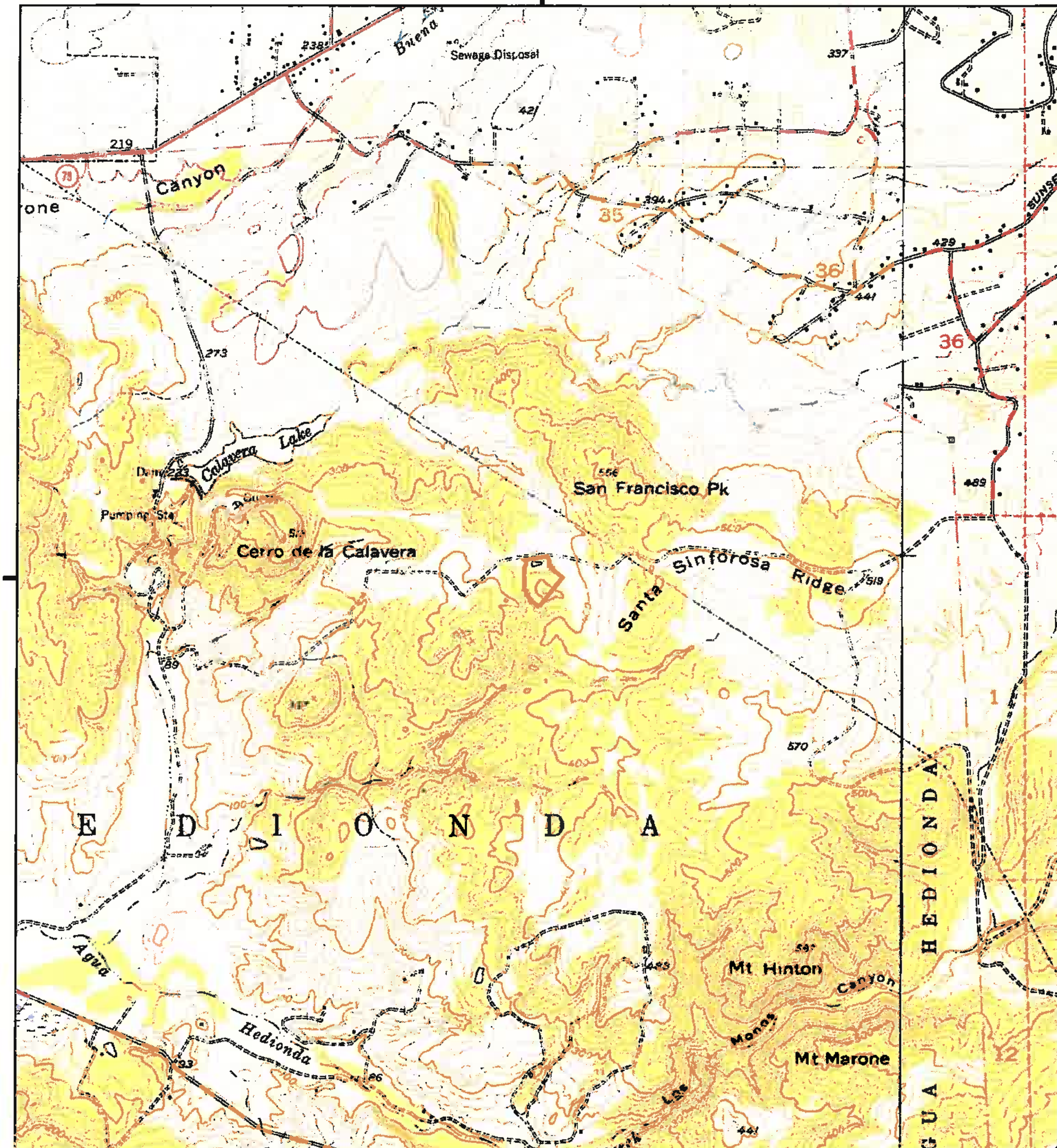
TP, San Luis Rey, 1968, 7.5-minute
E, San Marcos, 1968, 7.5-minute

SITE NAME: APN 169-562-01-00
ADDRESS: 4000 MYSTRA WAY
OCEANSIDE, CA 92056
CLIENT: LGCGEOENV

N

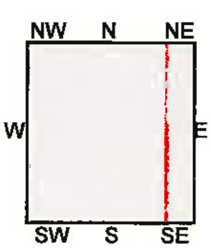
Historical Topo Map

1949



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



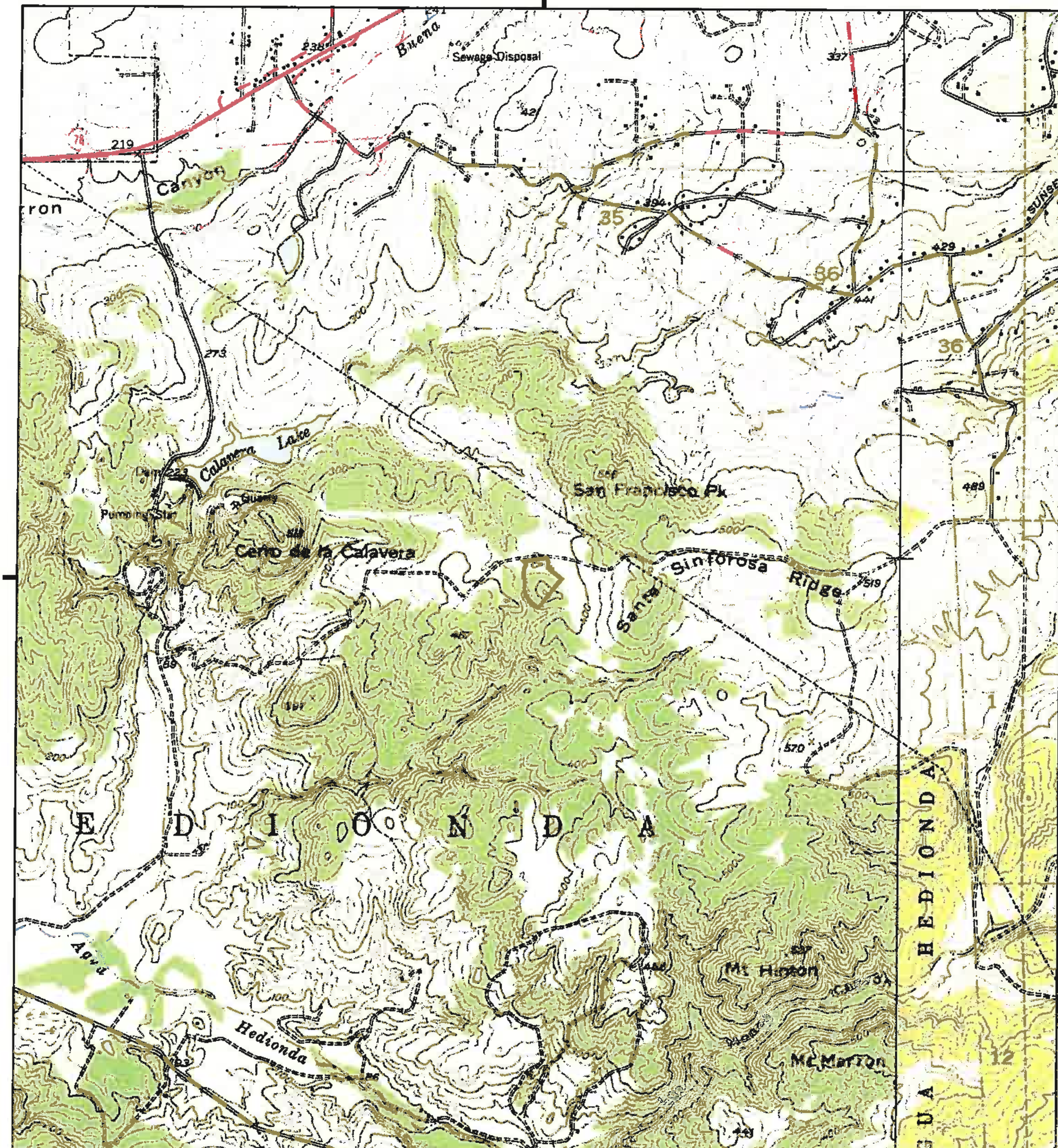
TP, San Luis Rey, 1949, 7.5-minute
E, San Marcos, 1949, 7.5-minute

SITE NAME: APN 169-562-01-00
ADDRESS: 4000 MYSTRA WAY
OCEANSIDE, CA 92056
CLIENT: LGCGEOENV

N

Historical Topo Map

1948



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE

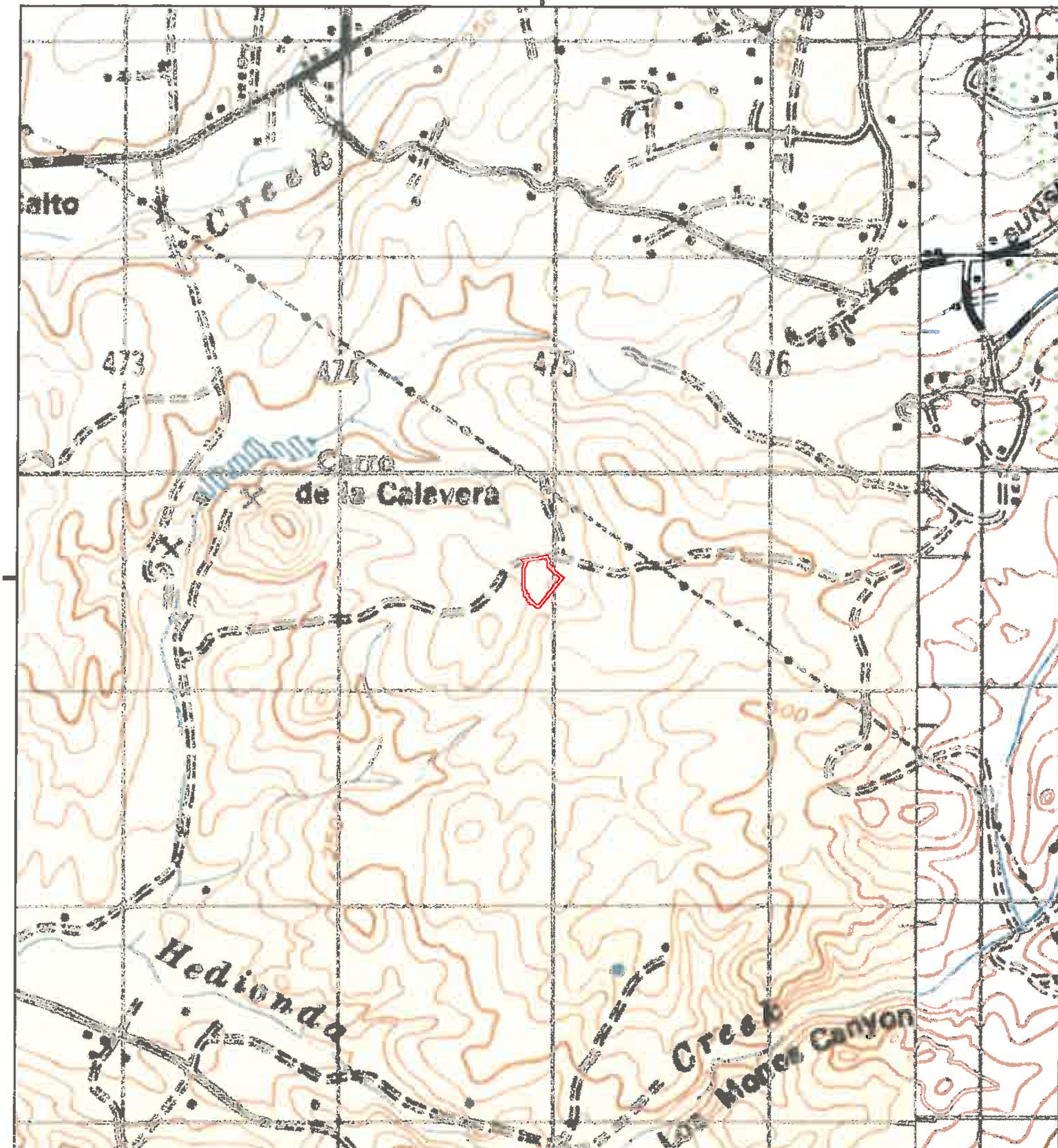
W E

SW S SE

TP, San Luis Rey, 1948, 7.5-minute
E, San Marcos, 1948, 7.5-minute

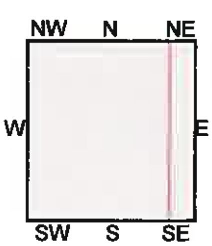
SITE NAME: APN 169-562-01-00
ADDRESS: 4000 MYSTRA WAY
OCEANSIDE, CA 92056
CLIENT: LGCGEOENV

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

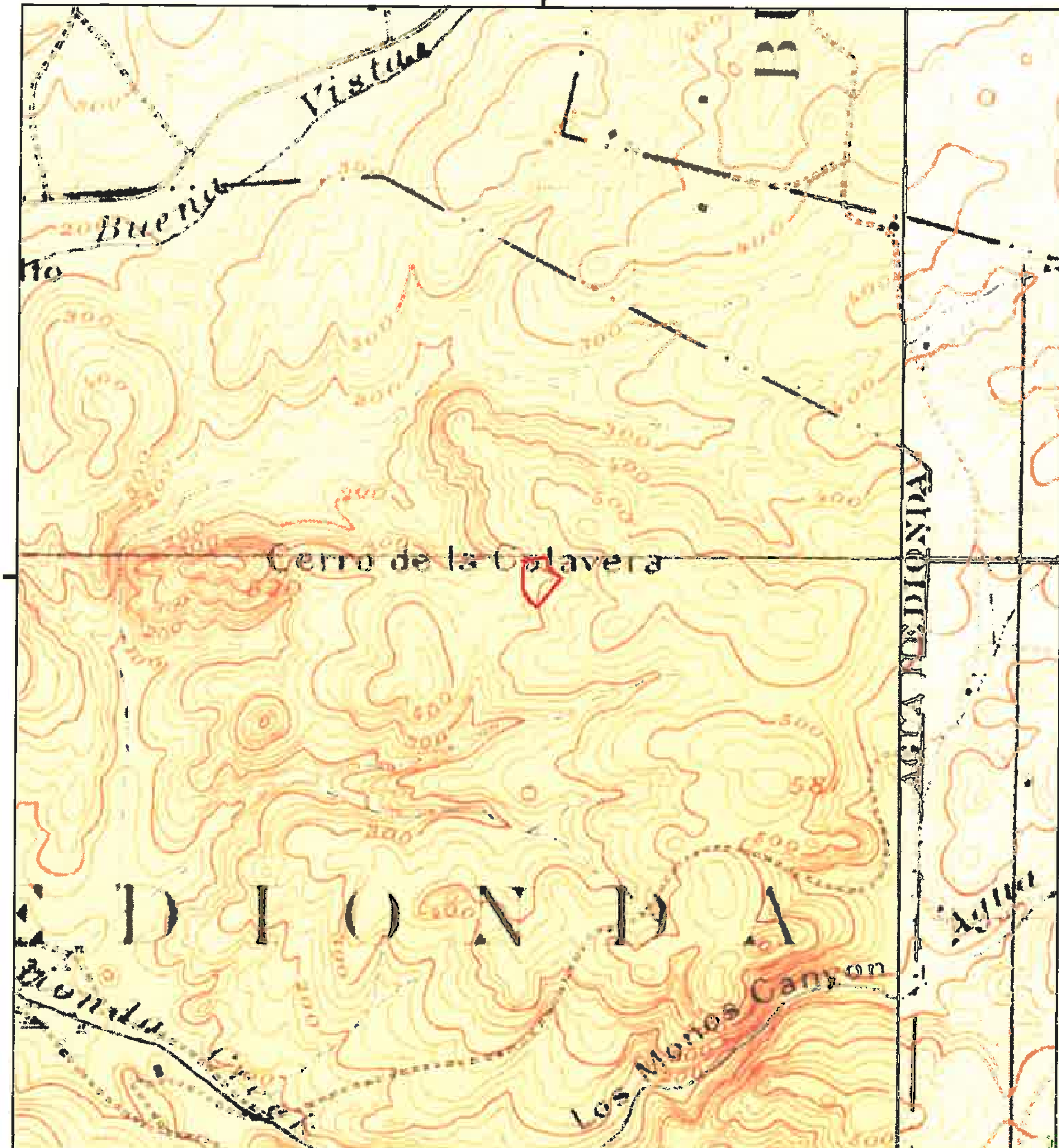


TP, OCEANSIDE, 1947, 15-minute
E, ESCONDIDO, 1947, 15-minute

SITE NAME: APN 169-562-01-00
ADDRESS: 4000 MYSTRA WAY
OCEANSIDE, CA 92056
CLIENT: LGCGEOENV

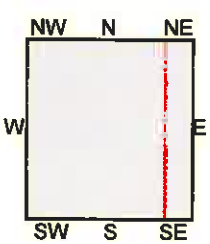
Historical Topo Map

1901



0 Miles 0.25 0.5 1 1.5

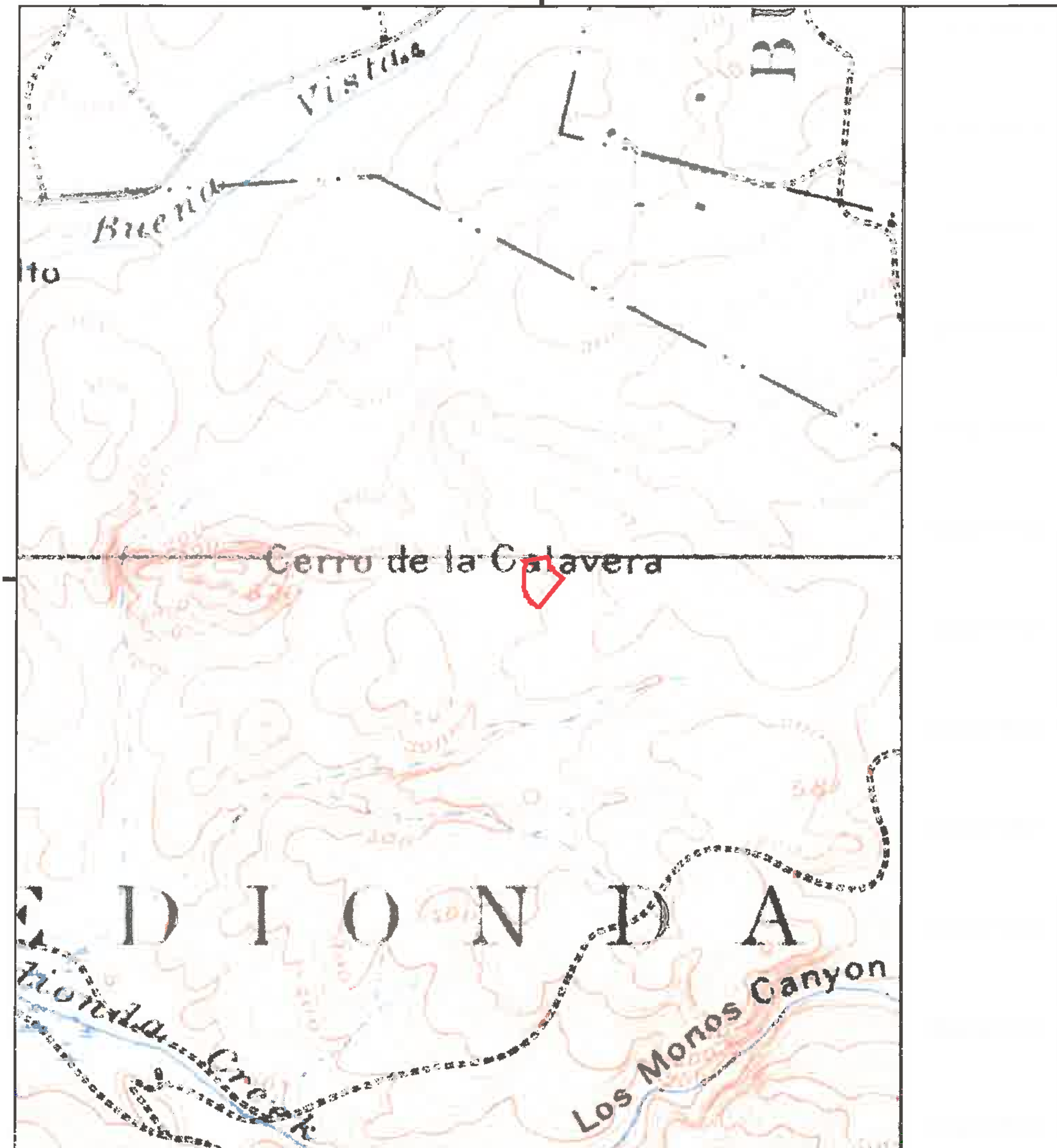
This report includes information from the following map sheet(s).



TP, Oceanside, 1901, 15-minute
E, Escondido, 1901, 15-minute

SITE NAME: APN 169-562-01-00
ADDRESS: 4000 MYSTRA WAY
OCEANSIDE, CA 92056
CLIENT: LGCGEOENV

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE W E SW S SE

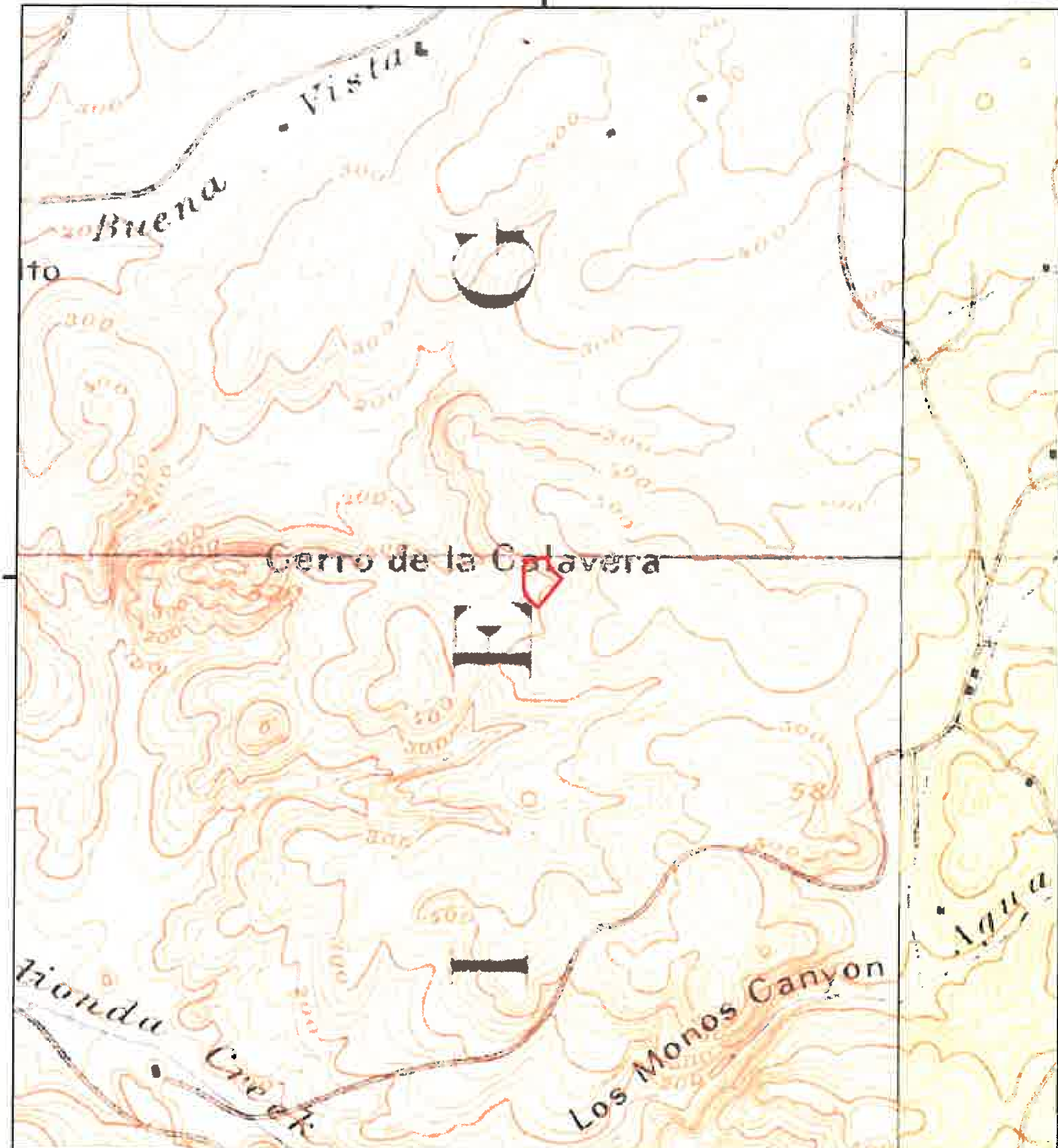
TP, Oceanside, 1898, 15-minute

SITE NAME: APN 169-562-01-00
ADDRESS: 4000 MYSTRA WAY
OCEANSIDE, CA 92056
CLIENT: LGCGEOENV

N

Historical Topo Map

1893



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE W E SW S SE

TP, Oceanside, 1893, 15-minute
E, Escondido, 1893, 15-minute

SITE NAME: APN 169-562-01-00
ADDRESS: 4000 MYSTRA WAY
OCEANSIDE, CA 92056
CLIENT: LGCGEOENV

N

APN 169-562-01-00
4000 MYSTRA WAY
OCEANSIDE, CA 92056

Inquiry Number: 4958705.6
June 06, 2017

The EDR Property Tax Map Report

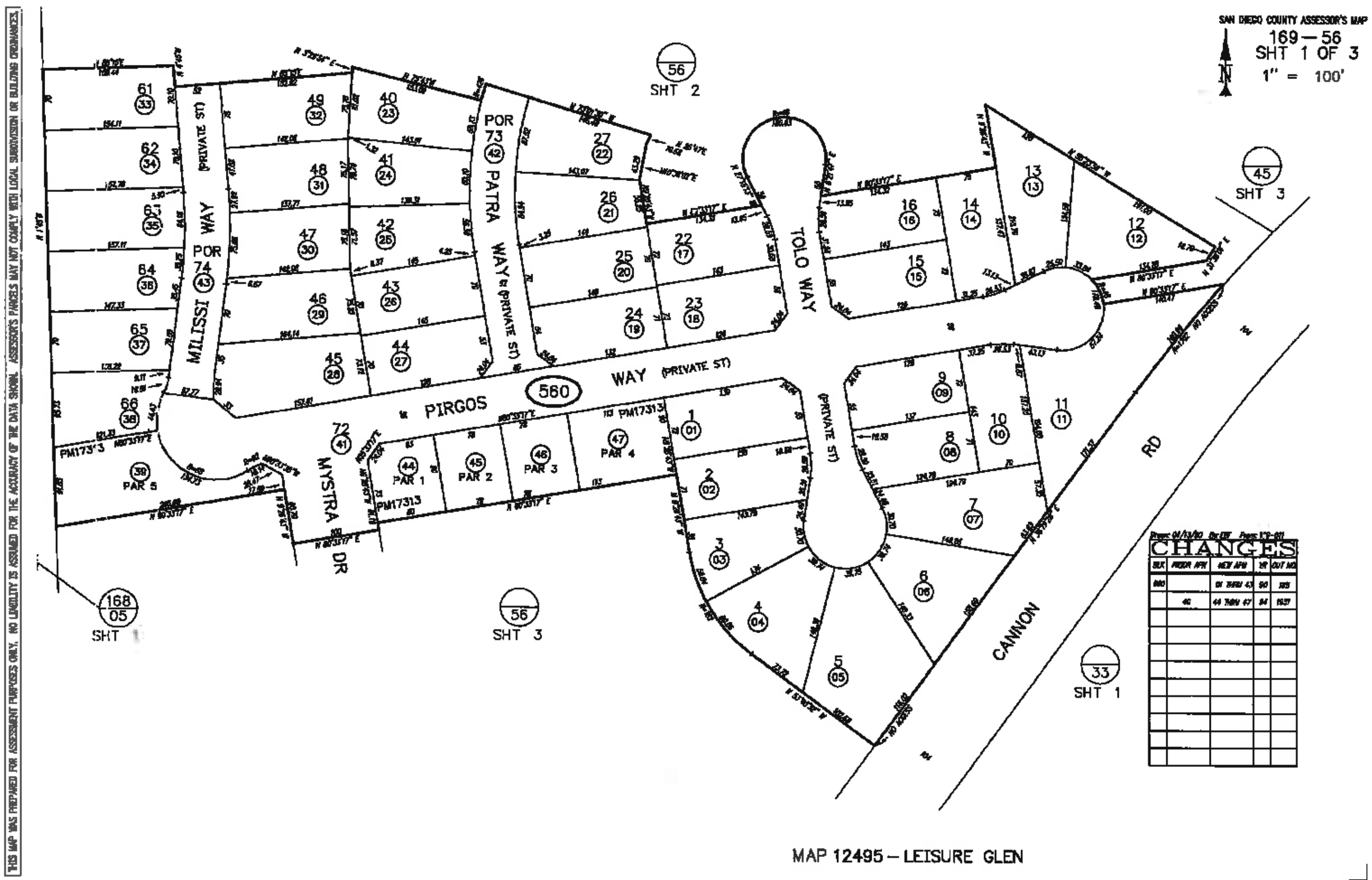
EDR® Environmental Data Resources Inc

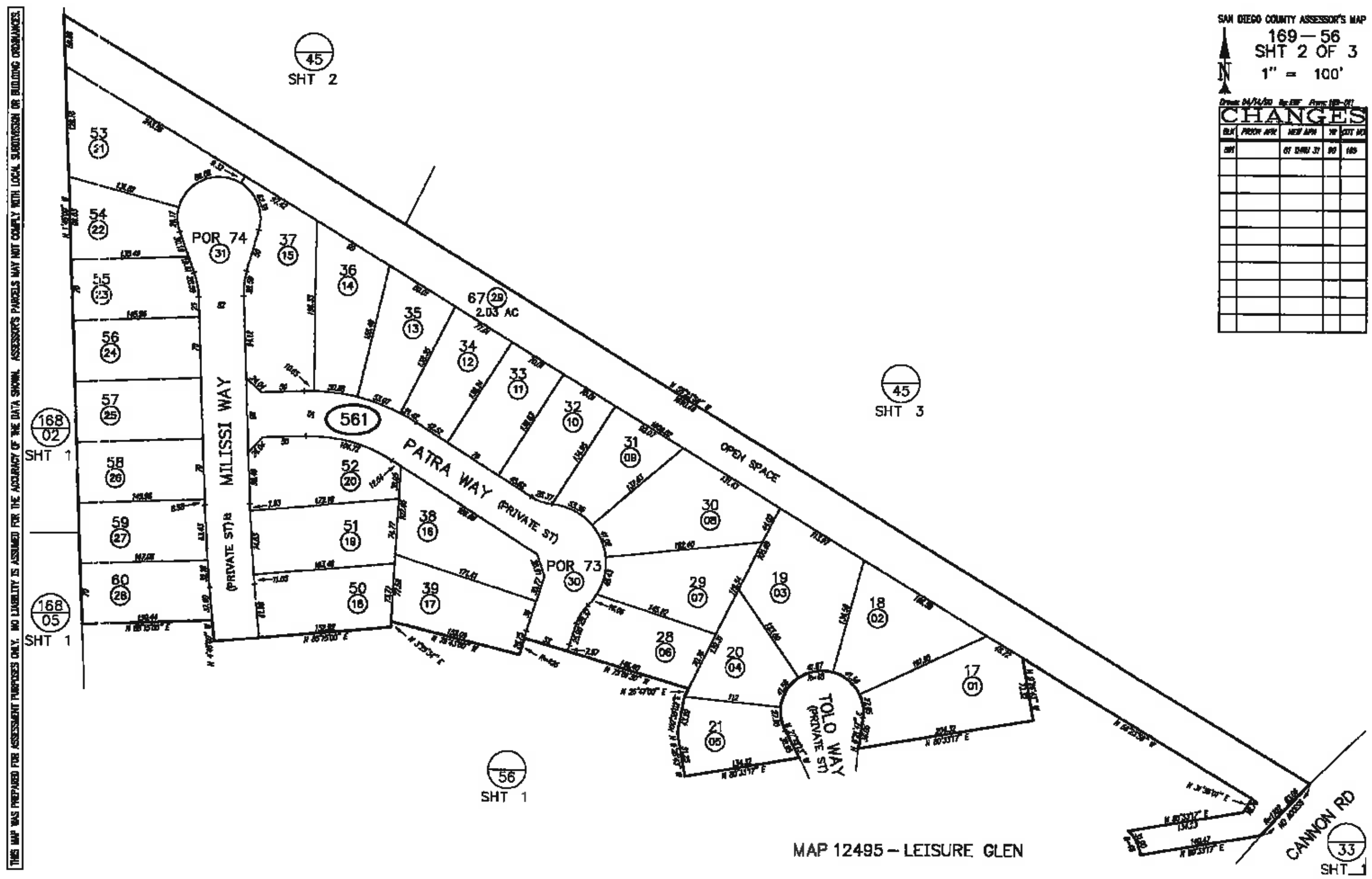
6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Property Tax Map Report

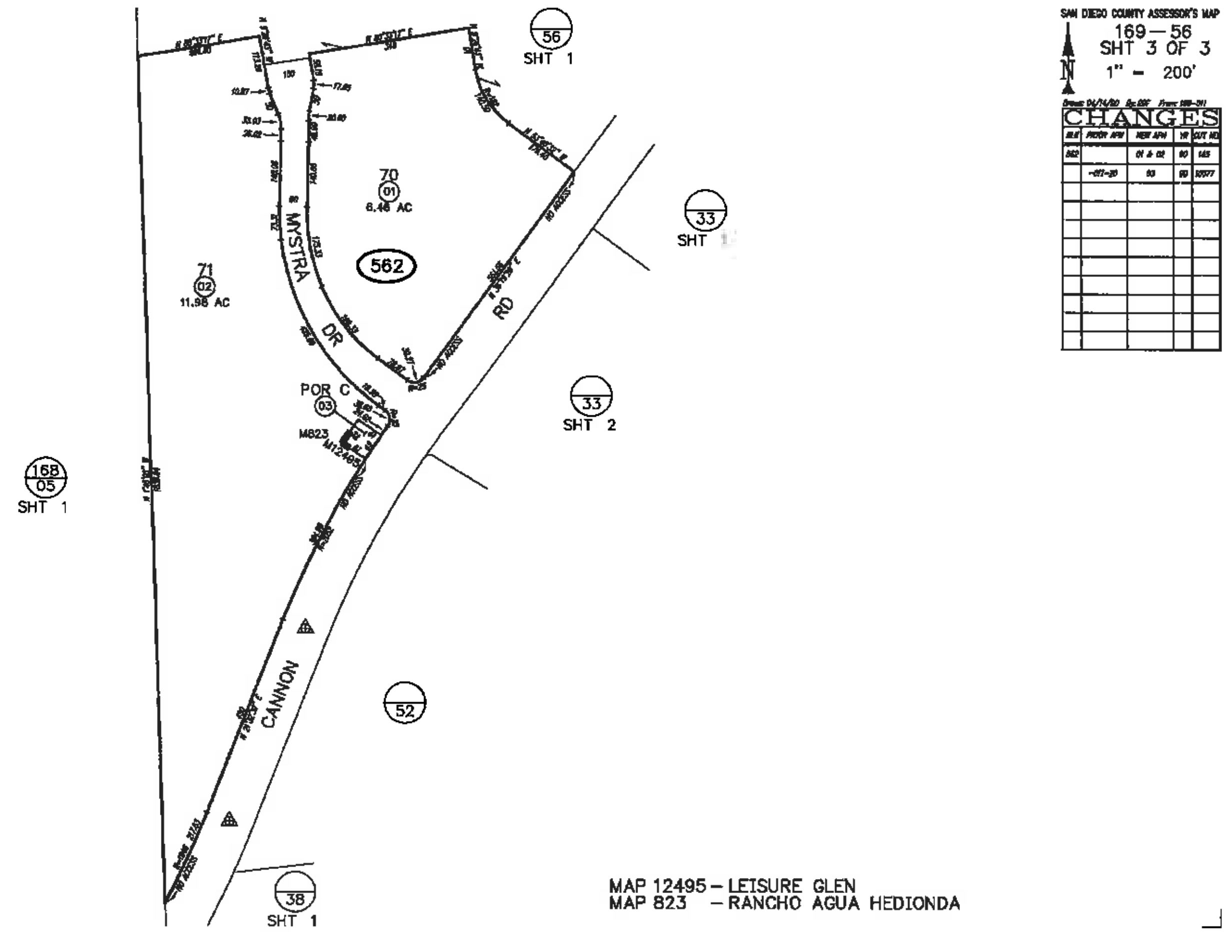
Environmental Data Resources, Inc.'s EDR Property Tax Map Report is designed to assist environmental professionals in evaluating potential environmental conditions on a target property by understanding property boundaries and other characteristics. The report includes a search of available property tax maps, which include information on boundaries for the target property and neighboring properties, addresses, parcel identification numbers, as well as other data typically used in property location and identification.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.


SAN DIEGO COUNTY ASSESSOR'S MAP
169 — 56
SHT 1 OF 3
1" = 100'
N
THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCELS MAY NOT COMPLY WITH LOCAL SUBDIVISION OR BUILDING ORDINANCES.
560
PIRGOS WAY (PRIVATE ST)
TOLO WAY (PRIVATE ST)
PATRA WAY (PRIVATE ST)
MILISSI WAY (PRIVATE ST)
MYSTRA DR
CANNON RD
POR 73
POR 74
PM17313
PAR 1
PAR 2
PAR 3
PAR 4
PAR 5
56 SHT 2
56 SHT 3
45 SHT 3
33 SHT 1
168 05 SHT
CHANGES
MAP 12495 — LEISURE GLEN


SAN DIEGO COUNTY ASSESSOR'S MAP
169 — 56
SHT 2 OF 3
1" = 100'
CHANGES
MILISSI WAY
(PRIVATE ST)
PATRA WAY (PRIVATE ST)
TOLO WAY
(PRIVATE ST)
CANNON RD
OPEN SPACE
POR 74
POR 73
561
67 (29) 2.03 AC
45 SHT 2
45 SHT 3
56 SHT 1
33 SHT 1
168 02 SHT 1
168 05 SHT 1
MAP 12495 – LEISURE GLEN
THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCELS MAY NOT COMPLY WITH LOCAL SUBDIVISION OR BUILDING ORDINANCES.

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCELS MAY NOT COMPLY WITH LOCAL SUBDIVISION OR BUILDING ORDINANCES.



APPENDIX D

ENVIRONMENTAL DATA RESOURCES, INC.
REPORTING

APN 169-562-01-00
4000 MYSTRA WAY
OCEANSIDE, CA 92056

Inquiry Number: 4958705.2s
June 07, 2017

The EDR Radius Map™ Report with GeoCheck®

EDR®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION **PAGE**

GEOCHECK ADDENDUM

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

4000 MYSTRA WAY
OCEANSIDE, CA 92056

COORDINATES

Latitude (North):	33.1657360 - 33° 9' 56.64"
Longitude (West):	117.2688830 - 117° 16' 7.97"
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	474928.6
UTM Y (Meters):	3669501.2
Elevation:	391 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5641318 SAN LUIS REY, CA
Version Date:	2012
East Map:	5641320 SAN MARCOS, CA
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140603
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
4000 MYSTRA WAY
OCEANSIDE, CA 92056

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL........................ National Priority List
Proposed NPL............... Proposed National Priority List Sites
NPL LIENS.................. Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL............... National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY........... Federal Facility Site Information listing
SEMS....................... Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE............... Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS................... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF.................. RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG................... RCRA - Large Quantity Generators
RCRA-SQG................... RCRA - Small Quantity Generators
RCRA-CESQG................. RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS...................... Land Use Control Information System
US ENG CONTROLS............ Engineering Controls Sites List

US INST CONTROL.......... Sites with Institutional Controls

Federal ERNS list

ERNS........................ Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE................. State Response Sites

State- and tribal - equivalent CERCLIS

ENVIROSTOR.............. EnviroStor Database

State and tribal landfill and/or solid waste disposal site lists

SWF/LF....................... Solid Waste Information System

State and tribal leaking storage tank lists

SAN DIEGO CO. SAM........ Environmental Case Listing
LUST.......................... Geotracker's Leaking Underground Fuel Tank Report
INDIAN LUST............... Leaking Underground Storage Tanks on Indian Land
SLIC........................... Statewide SLIC Cases

State and tribal registered storage tank lists

FEMA UST.................. Underground Storage Tank Listing
UST........................... Active UST Facilities
AST........................... Aboveground Petroleum Storage Tank Facilities
INDIAN UST................ Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

INDIAN VCP................ Voluntary Cleanup Priority Listing
VCP........................... Voluntary Cleanup Program Properties

State and tribal Brownfields sites

BROWNFIELDS............. Considered Brownfieds Sites Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS.......... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT.............. Waste Management Unit Database
SWRCY....................... Recycler Database
HAULERS.................... Registered Waste Tire Haulers Listing
INDIAN ODI................. Report on the Status of Open Dumps on Indian Lands
ODI........................... Open Dump Inventory

DEBRIS REGION 9 .... Torres Martinez Reservation Illegal Dump Site Locations
IHS OPEN DUMPS .... Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL .... Delisted National Clandestine Laboratory Register
HIST Cal-Sites .... Historical Calsites Database
SCH .... School Property Evaluation Program
CDL .... Clandestine Drug Labs
San Diego Co. HMMD .... Hazardous Materials Management Division Database
Toxic Pits .... Toxic Pits Cleanup Act Sites
US CDL .... National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

SWEEPS UST .... SWEEPS UST Listing
HIST UST .... Hazardous Substance Storage Container Database
CA FID UST .... Facility Inventory Database

Local Land Records

LIENS .... Environmental Liens Listing
LIENS 2 .... CERCLA Lien Information
DEED .... Deed Restriction Listing

Records of Emergency Release Reports

HMIRS .... Hazardous Materials Information Reporting System
CHMIRS .... California Hazardous Material Incident Report System
LDS .... Land Disposal Sites Listing
MCS .... Military Cleanup Sites Listing
SPILLS 90 .... SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR .... RCRA - Non Generators / No Longer Regulated
FUDS .... Formerly Used Defense Sites
DOD .... Department of Defense Sites
SCRD DRYCLEANERS .... State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR .... Financial Assurance Information
EPA WATCH LIST .... EPA WATCH LIST
2020 COR ACTION .... 2020 Corrective Action Program List
TSCA .... Toxic Substances Control Act
TRIS .... Toxic Chemical Release Inventory System
SSTS .... Section 7 Tracking Systems
ROD .... Records Of Decision
RMP .... Risk Management Plans
RAATS .... RCRA Administrative Action Tracking System
PRP .... Potentially Responsible Parties
PADS .... PCB Activity Database System
ICIS .... Integrated Compliance Information System
FTTS .... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS .... Material Licensing Tracking System
COAL ASH DOE .... Steam-Electric Plant Operation Data

COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations
FUSRAP	Formerly Utilized Sites Remedial Action Program
UMTRA	Uranium Mill Tailings Sites
LEAD SMELTERS	Lead Smelter Sites
US AIRS	Aerometric Information Retrieval System Facility Subsystem
US MINES	Mines Master Index File
ABANDONED MINES	Abandoned Mines
FINDS	Facility Index System/Facility Registry System
DOCKET HWC	Hazardous Waste Compliance Docket Listing
UXO	Unexploded Ordnance Sites
ECHO	Enforcement & Compliance History Information
FUELS PROGRAM	EPA Fuels Program Registered Listing
CA BOND EXP. PLAN	Bond Expenditure Plan
Cortese	"Cortese" Hazardous Waste & Substances Sites List
CUPA Listings	CUPA Resources List
DRYCLEANERS	Cleaner Facilities
EMI	Emissions Inventory Data
ENF	Enforcement Action Listing
Financial Assurance	Financial Assurance Information Listing
HAZNET	Facility and Manifest Data
ICE	ICE
HIST CORTESE	Hazardous Waste & Substance Site List
HWP	EnviroStor Permitted Facilities Listing
HWT	Registered Hazardous Waste Transporter Database
MINES	Mines Site Location Listing
MWMP	Medical Waste Management Program Listing
NPDES	NPDES Permits Listing
PEST LIC	Pesticide Regulation Licenses Listing
PROC	Certified Processors Database
Notify 65	Proposition 65 Records
UIC	UIC Listing
WASTEWATER PITS	Oil Wastewater Pits Listing
WDS	Waste Discharge System
WIP	Well Investigation Program Case List

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	EDR Proprietary Manufactured Gas Plants
EDR Hist Auto	EDR Exclusive Historic Gas Stations
EDR Hist Cleaner	EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF	Recovered Government Archive Solid Waste Facilities List

EXECUTIVE SUMMARY

RGA LUST------------------ Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

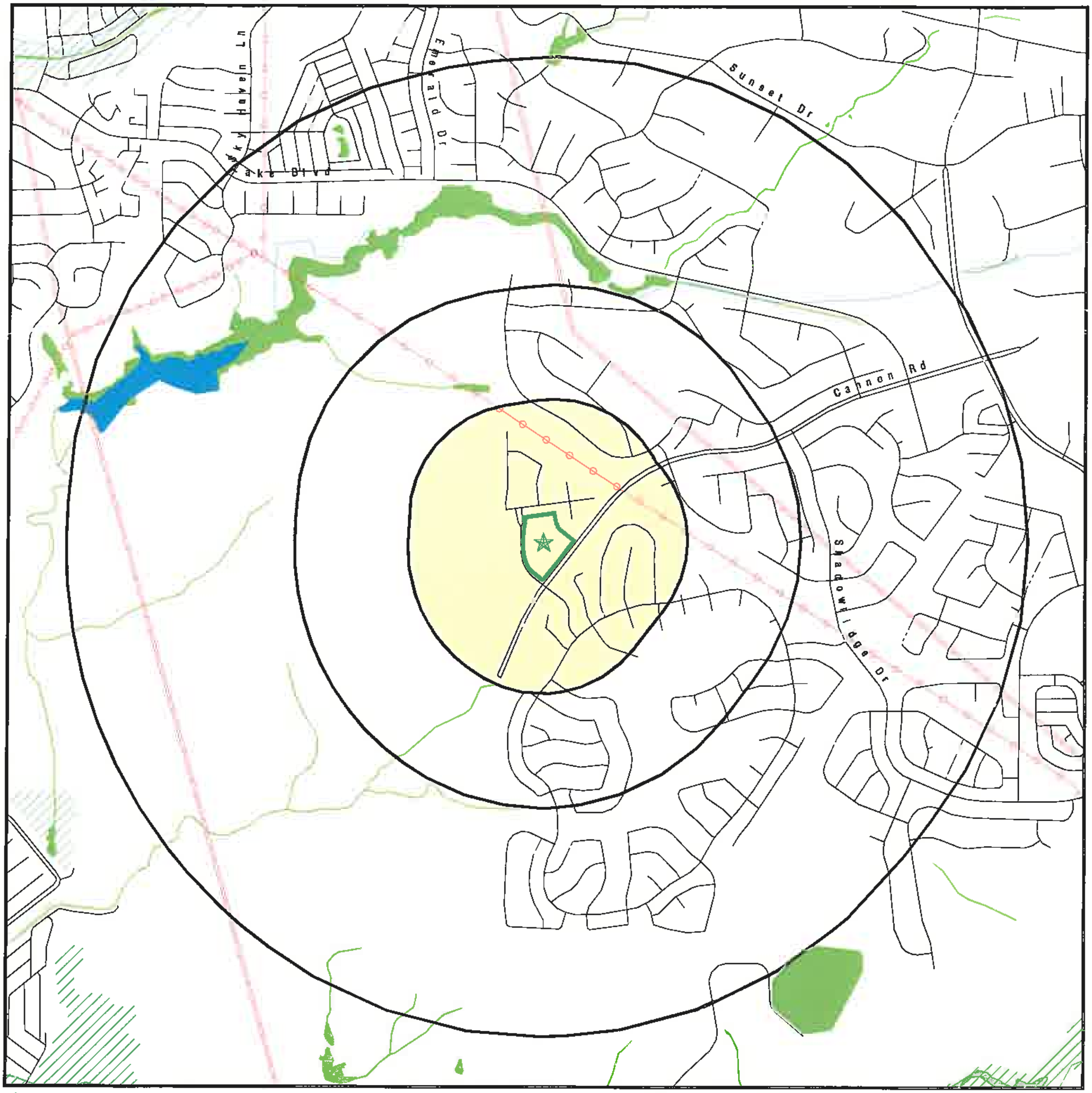
Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 1 records.

Site Name	Database(s)
MAX CLEANERS	DRYCLEANERS

OVERVIEW MAP - 4958705.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: APN 169-562-01-00 ADDRESS: 4000 MYSTRA WAY OCEANSIDE CA 92056 LAT/LONG: 33.165736 / 117.268883	CLIENT: LGCGEOENV CONTACT: Kyle Mchargue INQUIRY #: 4958705.2s DATE: June 07, 2017 0:00 am

DETAIL MAP - 4958705.2S

0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	APN 169-562-01-00	CLIENT:	LGCGEOENV
ADDRESS:	4000 MYSTRA WAY OCEANSIDE CA 92056	CONTACT:	Kyle Mchargue
LAT/LONG:	33.165736 / 117.268883	INQUIRY #:	4958705.2s
		DATE:	June 07, 2017 0:01 am

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	0.001		0	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
SAN DIEGO CO. SAM	0.500		0	0	0	NR	NR	0

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
SLIC	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	0.001		0	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
CDL	0.001		0	NR	NR	NR	NR	0
San Diego Co. HMMD	0.001		0	NR	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
CA FID UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS	0.001		0	NR	NR	NR	NR	0
LIENS 2	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0
CHMIRS	0.001		0	NR	NR	NR	NR	0
LDS	0.001		0	NR	NR	NR	NR	0
MCS	0.001		0	NR	NR	NR	NR	0
SPILLS 90	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	0.001		0	NR	NR	NR	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.001		0	NR	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
EMI	0.001		0	NR	NR	NR	NR	0
ENF	0.001		0	NR	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
HAZNET	0.001		0	NR	NR	NR	NR	0
ICE	0.001		0	NR	NR	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
HWT	0.250		0	0	NR	NR	NR	0
MINES	0.001		0	NR	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	0.001		0	NR	NR	NR	NR	0
PEST LIC	0.001		0	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	0.001		0	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	0	0	0	0	0	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NO SITES FOUND

Count: 1 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
OCEANSIDE	S105807806	MAX CLEANERS	CANNON RD STE 2F	92056	DRYCLEANERS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/05/2017
Date Data Arrived at EDR: 04/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 21

Source: EPA
Telephone: N/A
Last EDR Contact: 04/21/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/05/2017
Date Data Arrived at EDR: 04/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 21

Source: EPA
Telephone: N/A
Last EDR Contact: 04/21/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/05/2017
Date Data Arrived at EDR: 04/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 21

Source: EPA
Telephone: N/A
Last EDR Contact: 04/21/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 92

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 04/07/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 02/07/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 16

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 04/21/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 02/07/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 16

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 04/25/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 01/04/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 93

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 11/15/2016
Date Data Arrived at EDR: 11/29/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 11/15/2016
Date Data Arrived at EDR: 11/29/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 09/29/2016
Date Made Active in Reports: 11/11/2016
Number of Days to Update: 43

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/29/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 01/31/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 112

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 01/31/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 112

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/13/2017
Date Data Arrived at EDR: 02/15/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 76

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 05/17/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST: Leaking Underground Fuel Tank Report (GEOTRACKER)
Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 49

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Semi-Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 10/07/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/06/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 10/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/17/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 09/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases (GEOTRACKER)
Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 49

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/11/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Varies

UST: Active UST Facilities

Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 03/12/2017
Date Data Arrived at EDR: 03/16/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 57

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 03/16/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 03/24/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Quarterly

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 01/14/2017
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 10/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/17/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 10/06/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Semi-Annually

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 10/07/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 01/31/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 112

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Quarterly

State and tribal Brownfields sites

BROWNFIELDS: Considered Brownfieds Sites Listing
A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 01/03/2017
Date Data Arrived at EDR: 01/04/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 57

Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 03/29/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/02/2017
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 50

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 01/13/2017
Date Data Arrived at EDR: 01/17/2017
Date Made Active in Reports: 05/31/2017
Number of Days to Update: 134

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 36

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/28/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database
The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 01/31/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 112

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 54

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 04/10/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Varies

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 12/05/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 67

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Quarterly

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 67

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 03/06/2017
Date Data Arrived at EDR: 03/07/2017
Date Made Active in Reports: 04/21/2017
Number of Days to Update: 45

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/21/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/06/2017
Date Data Arrived at EDR: 03/07/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 77

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 03/07/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 37

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/29/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/06/2016
Date Data Arrived at EDR: 01/25/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 105

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing (GEOTRACKER)
Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 49

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing (GEOTRACKER)
Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 49

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 02/24/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/14/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/14/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/19/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 02/13/2017
Date Data Arrived at EDR: 02/15/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 05/17/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST
EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List
The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/24/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 11/24/2015
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 133

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/26/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/26/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 02/01/2017
Date Data Arrived at EDR: 02/09/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 04/21/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 05/09/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 01/20/2016
Date Data Arrived at EDR: 04/28/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 127

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/10/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 04/10/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 05/19/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 05/19/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 06/05/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/05/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/04/2017
Date Data Arrived at EDR: 01/06/2017
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 35

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/06/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 77

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/24/2015
Date Made Active in Reports: 09/30/2015
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/26/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/14/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 52

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 04/21/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/07/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/07/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Annually

US MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/08/2017
Date Data Arrived at EDR: 02/28/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 38

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing
This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing
Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines
An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/14/2017
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 21

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 03/13/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/04/2017
Date Data Arrived at EDR: 04/07/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 35

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 04/07/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information
ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 03/19/2017
Date Data Arrived at EDR: 03/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 03/21/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites
A listing of unexploded ordnance site locations

Date of Government Version: 10/25/2015
Date Data Arrived at EDR: 01/29/2016
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 67

Source: Department of Defense
Telephone: 571-373-0407
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Varies

DOCKET HWC: Hazardous Waste Compliance Docket Listing
A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 06/02/2016
Date Data Arrived at EDR: 06/03/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 91

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/22/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 79

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

CA BOND EXP. PLAN: Bond Expenditure Plan
Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 64

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 03/29/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Quarterly

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 04/11/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 42

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Annually

EMI: Emissions Inventory Data
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 09/23/2016
Date Made Active in Reports: 10/24/2016
Number of Days to Update: 31

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 03/21/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Varies

ENF: Enforcement Action Listing
A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 01/23/2017
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 118

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 04/25/2016
Date Data Arrived at EDR: 04/29/2016
Date Made Active in Reports: 06/21/2016
Number of Days to Update: 53

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 02/14/2017
Date Data Arrived at EDR: 02/17/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 97

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data
Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 10/12/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 64

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 04/14/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Annually

ICE: ICE
Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 11/21/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 62

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List
The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 11/21/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 62

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 04/11/2017
Date Data Arrived at EDR: 04/13/2017
Date Made Active in Reports: 04/26/2017
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 04/13/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Quarterly

MINES: Mines Site Location Listing
A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/14/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 30

Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 03/13/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Varies

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 86

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 03/07/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/15/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 107

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/17/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing
A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 12/06/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 03/03/2017
Number of Days to Update: 87

Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 03/07/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 03/13/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 50

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 12/16/2016
Date Data Arrived at EDR: 12/22/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 70

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 04/03/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: No Update Planned

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 01/20/2017
Date Data Arrived at EDR: 03/14/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 50

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water board?s review found that more than one-third of the region?s active disposal pits are operating without permission.

Date of Government Version: 04/15/2015
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/23/2015
Number of Days to Update: 67

Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 04/14/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Varies

WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 03/24/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 04/10/2017
Date Data Arrived at EDR: 04/11/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 31

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/10/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 04/10/2017
Date Data Arrived at EDR: 04/11/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 21

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/10/2017
Next Scheduled EDR Contact: 04/24/2047
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 03/06/2017
Date Data Arrived at EDR: 03/08/2017
Date Made Active in Reports: 04/14/2017
Number of Days to Update: 37

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing

Cupa facility list.

Date of Government Version: 01/31/2017
Date Data Arrived at EDR: 02/07/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 94

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 04/10/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 02/23/2017
Date Data Arrived at EDR: 02/24/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 77

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 11/17/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/26/2017
Number of Days to Update: 65

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 01/31/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/14/2017
Number of Days to Update: 70

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/24/2017
Date Data Arrived at EDR: 02/28/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 73

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 04/06/2017
Date Data Arrived at EDR: 04/07/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 40

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 03/31/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Semi-Annually

GLENN COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 111

Source: Glenn County Air Pollution Control District
Telephone: 830-934-6500
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

HUMBOLDT COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 03/20/2017
Date Data Arrived at EDR: 03/21/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 57

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List

Cupa facility list.

Date of Government Version: 01/23/2017
Date Data Arrived at EDR: 01/25/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 36

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 03/09/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 77

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 02/07/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 81

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 03/06/2017
Date Data Arrived at EDR: 03/07/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 71

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/18/2017
Date Data Arrived at EDR: 01/20/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 41

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 04/17/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Varies

LASSEN COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 11/30/2016
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 111

Source: Lassen County Environmental Health
Telephone: 530-251-8528
Last EDR Contact: 11/30/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 03/20/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 66

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 04/10/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/17/2017
Date Data Arrived at EDR: 04/18/2017
Date Made Active in Reports: 05/02/2017
Number of Days to Update: 14

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 04/18/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2016
Date Data Arrived at EDR: 01/26/2016
Date Made Active in Reports: 03/22/2016
Number of Days to Update: 56

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 04/17/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 03/29/2016
Date Data Arrived at EDR: 04/06/2016
Date Made Active in Reports: 06/13/2016
Number of Days to Update: 68

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 04/17/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/17/2017
Date Data Arrived at EDR: 01/18/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 112

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 04/17/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 03/10/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 54

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/10/2017
Date Data Arrived at EDR: 01/13/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 110

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 04/10/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 03/03/2017
Date Data Arrived at EDR: 03/07/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 71

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 03/31/2017
Date Data Arrived at EDR: 04/06/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 27

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 03/31/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 02/22/2017
Date Data Arrived at EDR: 02/23/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 83

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 02/21/2017
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 76

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing

CUPA Program listing from the Environmental Health Division.

Date of Government Version: 06/24/2016
Date Data Arrived at EDR: 06/27/2016
Date Made Active in Reports: 08/09/2016
Number of Days to Update: 43

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination

A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites

Underground storage tank sites located in Napa county.

Date of Government Version: 03/15/2017
Date Data Arrived at EDR: 03/16/2017
Date Made Active in Reports: 05/09/2017
Number of Days to Update: 54

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 02/09/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 05/17/2017
Number of Days to Update: 96

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups

Petroleum and non-petroleum spills.

Date of Government Version: 02/06/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 04/21/2017
Number of Days to Update: 70

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups

Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 11/04/2016
Date Data Arrived at EDR: 11/11/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 73

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 02/06/2017
Date Data Arrived at EDR: 02/07/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 85

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/09/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 09/02/2016
Date Data Arrived at EDR: 09/06/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 38

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Semi-Annually

PLUMAS COUNTY:

CUPA Facility List
Plumas County CUPA Program facilities.

Date of Government Version: 01/31/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 111

Source: Plumas County Environmental Health
Telephone: 530-283-6355
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/18/2017
Date Data Arrived at EDR: 04/20/2017
Date Made Active in Reports: 04/21/2017
Number of Days to Update: 1

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/20/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 01/19/2017
Date Data Arrived at EDR: 01/25/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 98

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/20/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 56

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/04/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 11/08/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 56

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/04/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Quarterly

SAN BENITO COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 11/30/2016
Date Data Arrived at EDR: 02/09/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 105

Source: San Benito County Environmental Health
Telephone: N/A
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 12/09/2016
Date Data Arrived at EDR: 12/13/2016
Date Made Active in Reports: 03/03/2017
Number of Days to Update: 80

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 10/05/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 86

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 03/10/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2015
Date Data Arrived at EDR: 11/07/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 58

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 06/05/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 02/28/2017
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 62

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 03/21/2017
Date Data Arrived at EDR: 03/23/2017
Date Made Active in Reports: 05/09/2017
Number of Days to Update: 47

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 03/20/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 02/21/2017
Date Data Arrived at EDR: 02/21/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 91

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 03/15/2017
Date Data Arrived at EDR: 04/07/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 33

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/09/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/15/2017
Date Data Arrived at EDR: 04/07/2017
Date Made Active in Reports: 04/21/2017
Number of Days to Update: 14

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 02/22/2017
Date Data Arrived at EDR: 02/23/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 89

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 11/10/2016
Date Made Active in Reports: 01/24/2017
Number of Days to Update: 75

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 90

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 03/14/2017
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 67

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 11/29/2016
Date Data Arrived at EDR: 12/21/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 1

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/09/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 03/15/2017
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 47

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/09/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 03/01/2017
Date Data Arrived at EDR: 03/30/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 54

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/04/2017
Date Data Arrived at EDR: 01/06/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 55

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Quarterly

STANISLAUS COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/20/2017
Date Data Arrived at EDR: 01/24/2017
Date Made Active in Reports: 05/18/2017
Number of Days to Update: 114

Source: Stanislaus County Department of Ennvironmental Protection
Telephone: 209-525-6751
Last EDR Contact: 11/30/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Varies

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 35

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Semi-Annually

TEHAMA COUNTY:

CUPA Facility List
Cupa facilities

Date of Government Version: 01/05/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 104

Source: Tehama County Department of Environmental Health
Telephone: 530-527-8020
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

TRINITY COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/23/2017
Date Data Arrived at EDR: 01/25/2017
Date Made Active in Reports: 05/18/2017
Number of Days to Update: 113

Source: Department of Toxic Substances Control
Telephone: 760-352-0381
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

TULARE COUNTY:

CUPA Facility List
Cupa program facilities

Date of Government Version: 01/05/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 05/25/2017
Number of Days to Update: 104

Source: Tulare County Environmental Health Services Division
Telephone: 559-624-7400
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/25/2017
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 34

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 12/27/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 103

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/31/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Quarterly

Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 10/27/2016
Date Made Active in Reports: 01/24/2017
Number of Days to Update: 89

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 04/24/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 02/27/2017
Date Data Arrived at EDR: 03/15/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/15/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 03/31/2017
Date Data Arrived at EDR: 04/06/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 27

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 03/31/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List

CUPA facility listing for Yuba County.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 01/31/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 112

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 09/29/2016
Date Made Active in Reports: 01/03/2017
Number of Days to Update: 96

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 04/11/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 02/01/2017
Date Made Active in Reports: 02/13/2017
Number of Days to Update: 12

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/03/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 07/22/2016
Date Made Active in Reports: 11/22/2016
Number of Days to Update: 123

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 04/18/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 04/14/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 50

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/13/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

TARGET PROPERTY ADDRESS

APN 169-562-01-00
4000 MYSTRA WAY
OCEANSIDE, CA 92056

TARGET PROPERTY COORDINATES

Latitude (North):	33.165736 - 33° 9' 56.65"
Longitude (West):	117.268883 - 117° 16' 7.98"
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	474928.6
UTM Y (Meters):	3669501.2
Elevation:	391 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5641318 SAN LUIS REY, CA
Version Date:	2012
East Map:	5641320 SAN MARCOS, CA
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

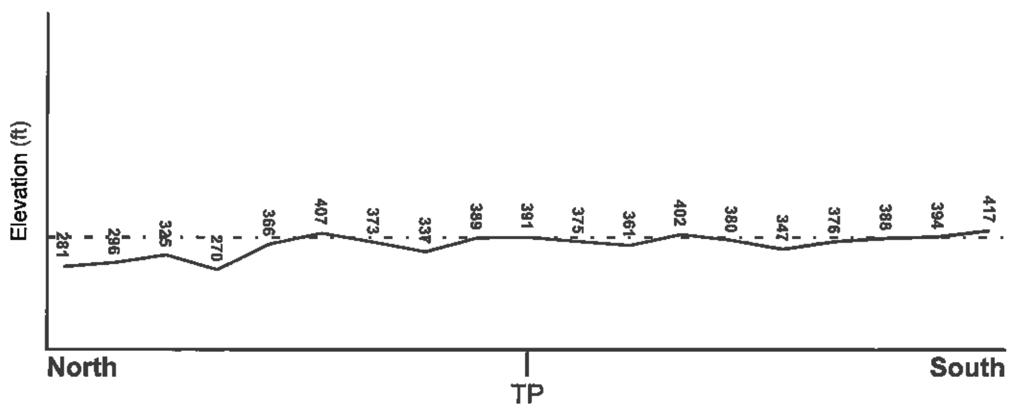
TOPOGRAPHIC INFORMATION

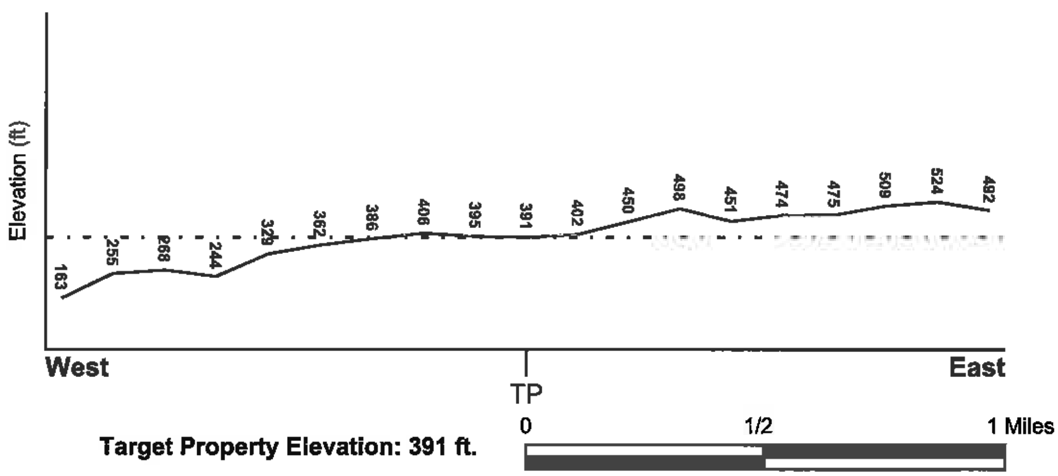
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General West

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 391 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
06073C0767G	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
06073C0766G	FEMA FIRM Flood data
06073C0768G	FEMA FIRM Flood data
06073C0769G	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
SAN LUIS REY	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data**:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site-specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

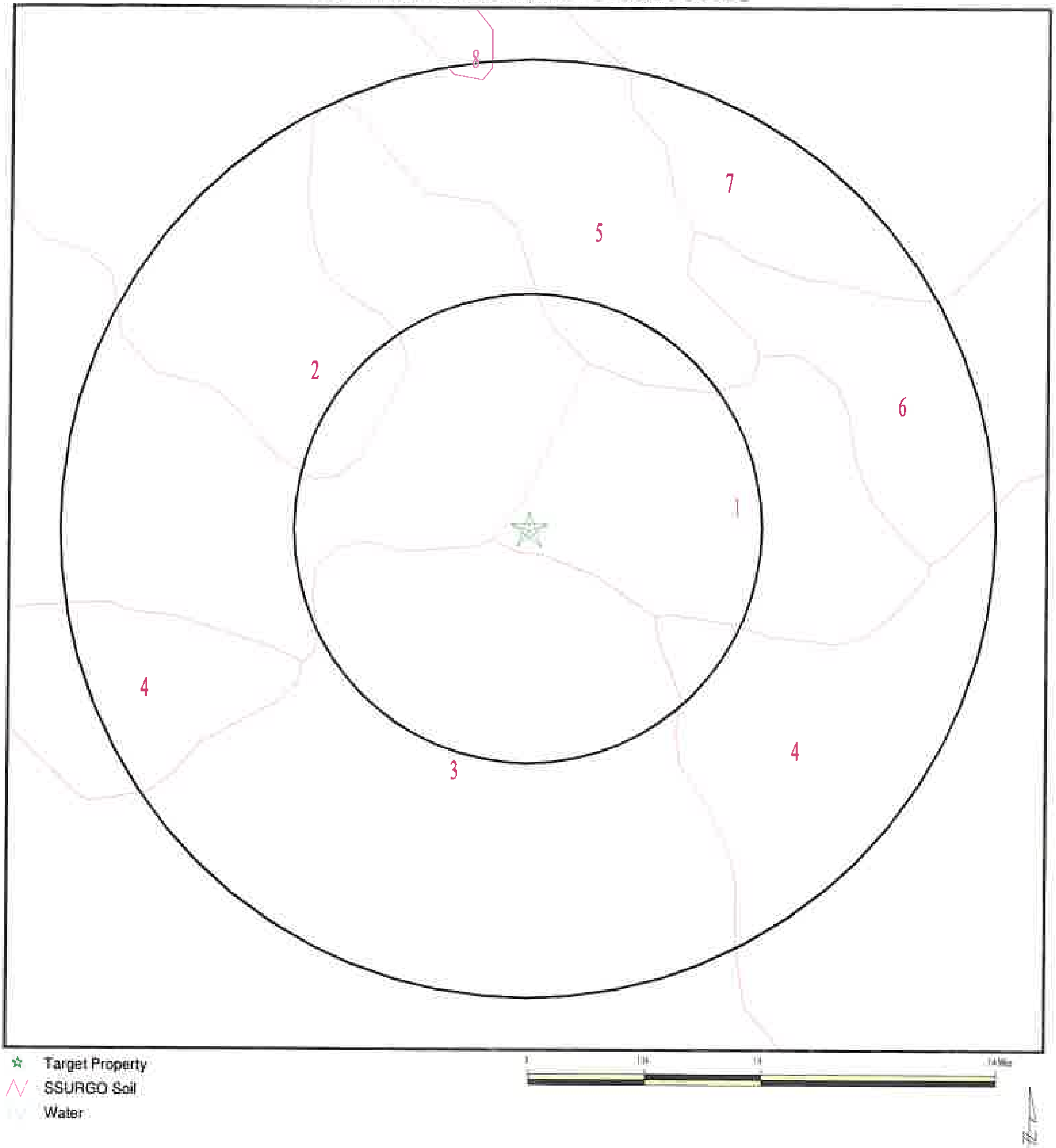
Era:	Mesozoic
System:	Cretaceous
Series:	Cretaceous granitic rocks
Code:	Kg *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Plutonic and Intrusive Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 4958705.2s



SITE NAME:	APN 169-562-01-00	CLIENT:	LGCGEOENV
ADDRESS:	4000 MYSTRA WAY OCEANSIDE CA 92056	CONTACT:	Kyle Mchargue
		INQUIRY #:	4958705.2s
LAT/LONG:	33.165736 / 117.268883	DATE:	June 07, 2017 0:01 am

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: HUERHUERO

Soil Surface Texture: loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 6 Min: 5.1
2	11 inches	55 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 0.42 Min: 0.01	Max: 8.4 Min: 7.4
3	55 inches	72 inches	stratified sand to sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4

Soil Map ID: 2

Soil Component Name: HUERHUERO

Soil Surface Texture: loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 14 Min: 4	Max: 6 Min: 5.1
2	11 inches	55 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 0.42 Min: 0.01	Max: 8.4 Min: 7.4
3	55 inches	72 inches	stratified sand to sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4

Soil Map ID: 3

Soil Component Name: CIENEBA

Soil Surface Texture: coarse sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 5 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	coarse sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 6 Min: 5.6
2	9 inches	9 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 4

Soil Component Name: BONSALL

Soil Surface Texture: sandy loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 7.3 Min: 6.1
2	7 inches	24 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 0.42 Min: 0.01	Max: 8.4 Min: 6.1
3	24 inches	33 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 0.42 Min: 0.01	Max: 8.4 Min: 7.9
4	33 inches	44 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.4
5	44 inches	59 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 7.8 Min: 7.4

Soil Map ID: 5

Soil Component Name: LAS FLORES

Soil Surface Texture: loamy fine sand

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	loamy fine sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 6.5 Min: 5.6
2	14 inches	22 inches	sandy clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 0.42 Min: 0.01	Max: 7.3 Min: 6.1
3	22 inches	38 inches	sandy clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.42 Min: 0.01	Max: 7.3 Min: 6.6
4	38 inches	48 inches	loamy coarse sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.3 Min: 6.6
5	48 inches	51 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 6

Soil Component Name: CIENEBA

Soil Surface Texture: coarse sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 5 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	coarse sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 6 Min: 5.6
2	7 inches	11 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 7

Soil Component Name: CIENEBA

Soil Surface Texture: coarse sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 5 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	coarse sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 6 Min: 5.6

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	9 inches	14 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 8

Soil Component Name: ALTAMONT

Soil Surface Texture: clay

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	20 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6
2	20 inches	29 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Fat Clay.	Max: 1.4 Min: 0.42	Max: 8.4 Min: 6.6
3	29 inches	33 inches	weathered bedrock	Not reported	Not reported	Max: Min:	Max: Min:

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 0.001 miles
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

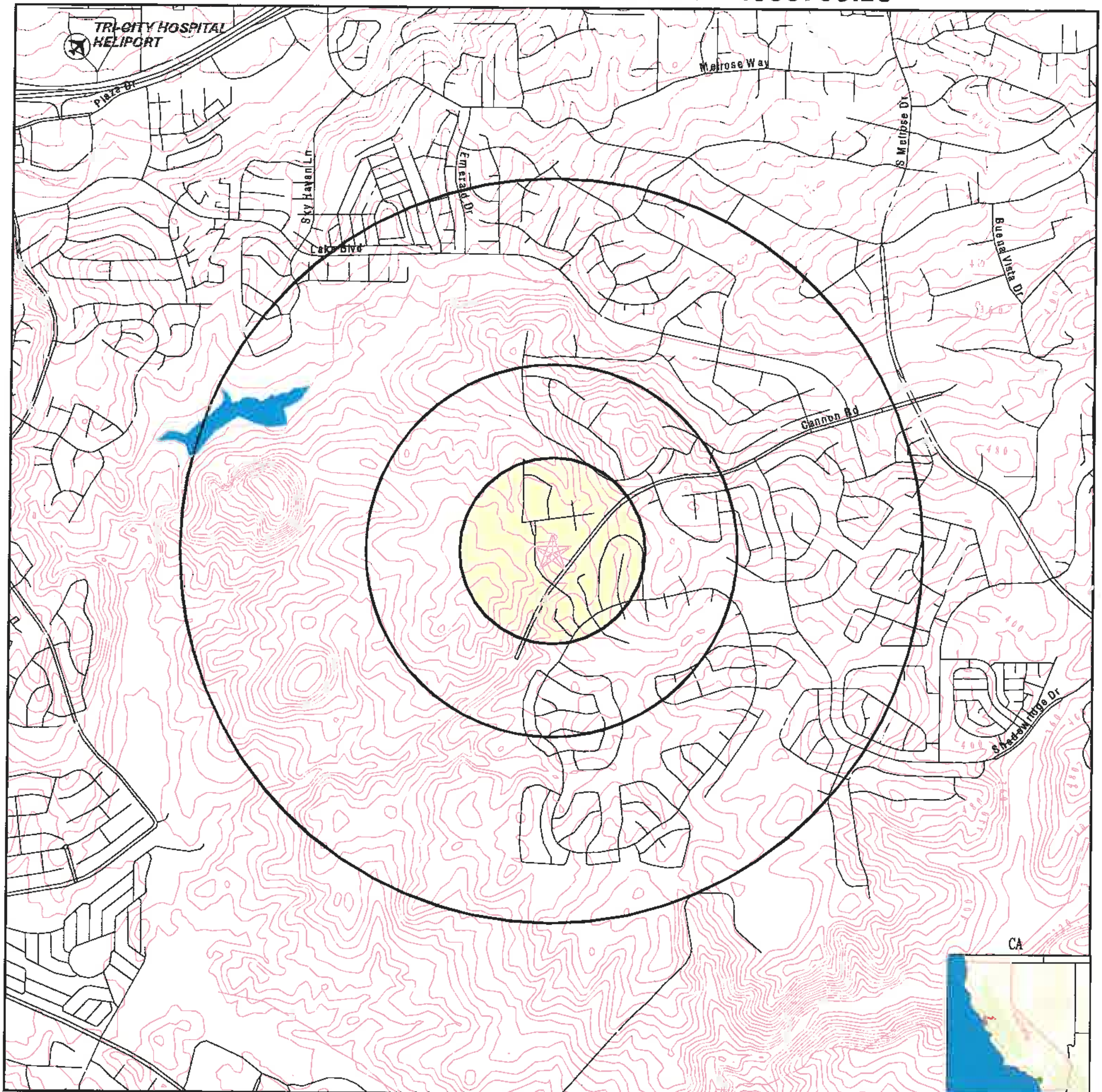
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

PHYSICAL SETTING SOURCE MAP - 4958705.2s



0 | 1/4 | 1/2 | 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Airports
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- Indeterminate Groundwater Flow at Location
- Groundwater Flow Varies at Location
- Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME: APN 169-562-01-00 ADDRESS: 4000 MYSTRA WAY OCEANSIDE CA 92056 LAT/LONG: 33.165736 / 117.268883	CLIENT: LGCGEOENV CONTACT: Kyle Mchargue INQUIRY #: 4958705.2s DATE: June 07, 2017 0:01 am

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92056	38	0

Federal EPA Radon Zone for SAN DIEGO County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 92056

Number of sites tested: 1

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.200 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

APN 169-562-01-00
4000 MYSTRA WAY
OCEANSIDE, CA 92056

Inquiry Number: 4958705.5
June 07, 2017

The EDR-City Directory Abstract

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1903 through 2014. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 660 feet of the target property.

A summary of the information obtained is provided in the text of this report.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

EDR is licensed to reproduce certain City Directory works by the copyright holders of those works. The purchaser of this EDR City Directory Report may include it in report(s) delivered to a customer. Reproduction of City Directories without permission of the publisher or licensed vendor may be a violation of copyright.

Data by

infoUSA®

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Year	*Source*	*TP*	*Adjoining*	*Text Abstract*	*Source Image*
2014	EDR Digital Archive	-	X	X	-
	EDR Digital Archive	X	X	X	-
2010	EDR Digital Archive	-	X	X	-
	EDR Digital Archive	X	X	X	-
2006	Haines Company, Inc.	X	X	X	X
2000	Haines Company, Inc.	X	X	X	-
1995	PACIFIC BELL WHITE PAGES	X	-	X	-
1992	PACIFIC BELL WHITE PAGES	-	-	-	-
1991	PACIFIC BELL WHITE PAGES	-	-	-	-
1989	Pacific Bell	-	-	-	-
1985	PACIFIC BELL WHITE PAGES	-	-	-	-
1984	R. L. Polk & Co.	-	-	-	-

EXECUTIVE SUMMARY

Year	Source	TP	Adjoining	Text Abstract	Source Image
1980	Pacific Telephone	-	-	-	-
1976	Luskey Brothers & Co., Inc.	-	-	-	-
1975	R. L. Polk Co.	-	-	-	-
1971	Community Directory Co.	-	-	-	-
1970	John M. Ducy	-	-	-	-
1966	R. L. Polk Co.	-	-	-	-
1965	Luskey Brothers Co., Inc.	-	-	-	-
1962	Community Directory Co.	-	-	-	-
1961	R. L. Polk & Co.	-	-	-	-
1960	The Pacific Telephone Telegraph Co.	-	-	-	-
1956	R. L. Polk & Co.	-	-	-	-
1955	The Pacific Telephone & Telegraph Co.	-	-	-	-
1952	R. L. Polk Co. of California	-	-	-	-
1950	The Pacific Telephone Telegraph Co.	-	-	-	-
1948	San Diego Directory Co.	-	-	-	-
1945	San Diego Directory Co.	-	-	-	-
1943	San Diego Directory Co.	-	-	-	-
1940	San Diego Directory Co.	-	-	-	-
1938	San Diego Directory Co.	-	-	-	-
1933	San Diego Directory Co.	-	-	-	-
1927	San Diego Directory Co.	-	-	-	-
1921	San Diego Directory Co. Inc.	-	-	-	-
1907	San Diego Directory Co.	-	-	-	-
1903	San Diego Directory Co.	-	-	-	-

FINDINGS

TARGET PROPERTY INFORMATION

ADDRESS

4000 MYSTRA WAY
OCEANSIDE, CA 92056

FINDINGS DETAIL

Target Property research detail.

MYSTRA DR

4000 MYSTRA DR

Year	Uses	Source
2000	NEW VENTURE CHRIST FLLWSHP TTY	Haines Company, Inc.
	NEW VENTURE CHRISTIAN SCHOOLS	Haines Company, Inc.
	NEW VENTURE CHRISTN	Haines Company, Inc.
1995	From Oceanside Telephones Call	PACIFIC BELL WHITE PAGES

Mystra Way

4000 Mystra Way

Year	Uses	Source
2014	NEW VENTURE CHRISTN FELLOWSHIP	EDR Digital Archive
2010	NEW VENTURE CHRISTN FELLOWSHIP	EDR Digital Archive

MYSTRA WAY

4000 MYSTRA WAY

Year	Uses	Source	
2006	NEW VENTURE CHRISTIAN FELLWSHP	Haines Company, Inc.	Image pg. A1

FINDINGS

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

MILISSI WAY

5006 MILISSI WAY

Year	Uses	Source	
2006	ROLLAND Bruce	Haines Company, Inc.	Image pg. A2
2000	ROLLAND Bruce	Haines Company, Inc.	

PATRA WAY

5006 PATRA WAY

Year	Uses	Source	
2006	MONTANO Edward	Haines Company, Inc.	Image pg. A3
2000	MONTANO Edward	Haines Company, Inc.	

PIRGOS WAY

3400 PIRGOS WAY

Year	Uses	Source	
2006	MUICH Eric	Haines Company, Inc.	Image pg. A4
	CHAPMAN D	Haines Company, Inc.	Image pg. A4
2000	CORTEZ Margaret	Haines Company, Inc.	

3410 PIRGOS WAY

Year	Uses	Source	
2006	TAYLOR Robert	Haines Company, Inc.	Image pg. A4

Pirgos Way

3420 Pirgos Way

Year	Uses	Source
2014	EASY BUTTON CHARTS	EDR Digital Archive
2010	EASY BUTTON CHARTS	EDR Digital Archive

FINDINGS

PIRGOS WAY

3420 PIRGOS WAY

Year	*Uses*	*Source*	
2006	SNELLER Mark	Haines Company, Inc.	Image pg. A4

3430 PIRGOS WAY

Year	*Uses*	*Source*	
2006	MERCHANT Ingrid	Haines Company, Inc.	Image pg. A4

FINDINGS

TARGET PROPERTY: ADDRESS NOT IDENTIFIED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not identified in the research source.

Address Researched	Address Not Identified in Research Source
4000 MYSTRA WAY	1992, 1991, 1989, 1985, 1984, 1980, 1976, 1975, 1971, 1970, 1966, 1965, 1962, 1961, 1960, 1956, 1955, 1952, 1950, 1948, 1945, 1943, 1940, 1938, 1933, 1927, 1921, 1907, 1903

ADJOINING PROPERTY: ADDRESSES NOT IDENTIFIED IN RESEARCH SOURCE

The following Adjoining Property addresses were researched for this report, and the addresses were not identified in research source.

Address Researched	Address Not Identified in Research Source
3400 PIRGOS WAY	2014, 2010, 1995, 1992, 1991, 1989, 1985, 1984, 1980, 1976, 1975, 1971, 1970, 1966, 1965, 1962, 1961, 1960, 1956, 1955, 1952, 1950, 1948, 1945, 1943, 1940, 1938, 1933, 1927, 1921, 1907, 1903
3410 PIRGOS WAY	2014, 2010, 2000, 1995, 1992, 1991, 1989, 1985, 1984, 1980, 1976, 1975, 1971, 1970, 1966, 1965, 1962, 1961, 1960, 1956, 1955, 1952, 1950, 1948, 1945, 1943, 1940, 1938, 1933, 1927, 1921, 1907, 1903
3420 PIRGOS WAY	2014, 2010, 2000, 1995, 1992, 1991, 1989, 1985, 1984, 1980, 1976, 1975, 1971, 1970, 1966, 1965, 1962, 1961, 1960, 1956, 1955, 1952, 1950, 1948, 1945, 1943, 1940, 1938, 1933, 1927, 1921, 1907, 1903
3420 Pirgos Way	2006, 2000, 1995, 1992, 1991, 1989, 1985, 1984, 1980, 1976, 1975, 1971, 1970, 1966, 1965, 1962, 1961, 1960, 1956, 1955, 1952, 1950, 1948, 1945, 1943, 1940, 1938, 1933, 1927, 1921, 1907, 1903
3430 PIRGOS WAY	2014, 2010, 2000, 1995, 1992, 1991, 1989, 1985, 1984, 1980, 1976, 1975, 1971, 1970, 1966, 1965, 1962, 1961, 1960, 1956, 1955, 1952, 1950, 1948, 1945, 1943, 1940, 1938, 1933, 1927, 1921, 1907, 1903
5006 MILISSI WAY	2014, 2010, 1995, 1992, 1991, 1989, 1985, 1984, 1980, 1976, 1975, 1971, 1970, 1966, 1965, 1962, 1961, 1960, 1956, 1955, 1952, 1950, 1948, 1945, 1943, 1940, 1938, 1933, 1927, 1921, 1907, 1903
5006 PATRA WAY	2014, 2010, 1995, 1992, 1991, 1989, 1985, 1984, 1980, 1976, 1975, 1971, 1970, 1966, 1965, 1962, 1961, 1960, 1956, 1955, 1952, 1950, 1948, 1945, 1943, 1940, 1938, 1933, 1927, 1921, 1907, 1903

Source Page Images Appendix

MYSTRA WAY 2006

MYKONOS LN (01) 92130 SAN DIEGO

WEALTH CODE 9

[illegible]

X CARMEL CREEK RD

★ 6 BUS 46 RES 10 NEW

MYNAH PL 92083 VISTA

WEALTH CODE 4.4

X MARABOU LN

[illegible]

★ 0 BUS 5 RES 0 NEW

MYRICA LN 92127 SAN DIEGO

WEALTH CODE 8

X MATINAL CIR

[illegible]

★ 0 BUS 16 RES 0 NEW

MYRICKS CT (97) 92065 RAMONA

WEALTH CODE 2

X 10TH ST

[illegible]

★ 0 BUS 2 RES 0 NEW

MYRTLE CT 92011 CARLSBAD

X LINDEN TER

[illegible]

★ 0 BUS 7 RES 1 NEW

MYRTLEWOOD CT 92027 ESCONDIDO

WEALTH CODE 3

X WANEK RD

[illegible]

X WHITE OAK PL

★ 0 BUS 13 RES 1 NEW

MYRTLEWOOD CT 92054 OCEANSIDE

WEALTH CODE 2

X MAGNOLIA RD

[illegible]

★ 0 BUS 13 RES 0 NEW

MYSTERY MOUNTAIN RD 92082 VALLEY CENTER

WEALTH CODE 7

[illegible]

X WILKES RD

★ 2 BUS 11 RES 0 NEW

MYSTIK RD 92056 OCEANSIDE

WEALTH CODE 2

X HAVENWOOD DR

[illegible]

X LONESPUR CT

X ROCKSPRINGS PL

[illegible]

X PANORAMA RIDGE RD

[illegible]

X CASPER ST

[illegible]

X PEACOCK BLVD

[illegible]

X HIGHRIDGE DR

[illegible]

X TEMPLE HEIGHTS DR

★ 0 BUS 54 RES 9 NEW

MYSTRA WAY 92056 OCEANSIDE

WEALTH CODE 5

X LEISURE VILLAGE DR

[illegible]

X PIRGOS WAY

★ 1 BUS 0 RES 0 NEW

NABAL ST 92025 ESCONDIDO

WEALTH CODE 8

X CANYON RD

[illegible]

X MARY LN

★ 1 BUS 29 RES 2 NEW

NACIDO CT 92128 SAN DIEGO

WEALTH CODE 5

[illegible]

X NACIDO DR

★ 0 BUS 4 RES 0 NEW

NACIDO DR 92128 SAN DIEGO

WEALTH CODE 5.5

X MESTO CT

[illegible]

X NACIDO CT

[illegible]

X PABLO DR

[illegible]

X SELVA DR

[illegible]

X RODADA DR

[illegible]

X POMERADO RD

★ 0 BUS 39 RES 2 NEW

NAHANT CT 92109 SAN DIEGO

WEALTH CODE 3

MISSION BEACH AREA

X OCEAN FRONT WALK

X STRAND WAY

X MISSION BLVD

[illegible]

X BAYSIDE LN

★ 0 BUS 11 RES 1 NEW

NAIAD ST 92024 ENCINITAS

WEALTH CODE 6

X HYMETTUS AVE

[illegible]

X EOLUS AVE

★ 0 BUS 14 RES 0 NEW

NALCO ST 92126 SAN DIEGO

WEALTH CODE 6

[illegible]

X TERESA DR

[illegible]

X JAGROSS CT

[illegible]

★ 0 BUS 30 RES 2 NEW

NANCY RIDGE DR 92121 SAN DIEGO

WEALTH CODE 0

X CARROLL CANYON RD

[illegible]

X CARROLL RD

★ 187 BUS 0 RES 21 NEW

NANCY ST 92027 ESCONDIDO

WEALTH CODE 7

X OAK HILL DR

[illegible]

X KINGSTON DR

[illegible]

X FONDALE CT

[illegible]

X KENORA DR

★ 0 BUS 22 RES 1 NEW

NANCY WAY 92083 VISTA

WEALTH CODE 4

X PHILLIPS ST

[illegible]

★ 1 BUS 12 RES 2 NEW

NANDAY CT (04) 92057 OCEANSIDE

[illegible]

★ 0 BUS 23 RES 4 NEW

NANDINA CT (01) 92026 ESCONDIDO

WEALTH CODE 7

[illegible]

X NANDINA DR

[illegible]

★ 0 BUS 15 RES 5 NEW

MILISSI WAY 2006

4740 • GRIFFITH James P 760-967-0731• 8
4750 • JOHNSON Gerald 760-754-8223 9
• JOHNSON Gerald 760-754-2023 9
4810 • PAYNE Joseph OO 2
4820 • HARRIGAN Michael OO 4
4830 • MCKINNEY Brian 760-629-9484 +6
4840 • BESRIN Thomas OO 9
4850 • QUINTIVANO Guillermo C 760-436-6192 6
4870 • CARROLL Corinne OO 8
4910 • RINDON William 760-967-4373 0
4920 • MEDINA G 760-439-1380 4
PERKINS Emerline 760-967-1548 1
4930 • DELEON Ronald OO 4
4940 XXXX OO
X BELFLORA WAY
★ 0 BUS 75 RES 7 NEW

MILBANK RD 92024 ENCINITAS

WEALTH CODE 7

X BISHOPS GATE RD
1801 FABRIZIO Lisa 760-436-7889
1803 • PORTER Carla OO 2
1807 TYLER George L 760-632-6497 4
1809 XXXX OO
1810 HILL Haven 760-436-1107
1812 • ARMS Stephen OO 4
1813 • ORSO Gary 760-479-1674 2
1815 • OSTERMAN Joe OO 4
1819 HERALD J 760-753-8623
• SHIRES Stephen 760-753-8623
1820 • GRAU Peter OO 0
1822 • COURTNEY Richard D Lt Col Ret 760-753-6746
1823 • JOHNSON Deanne 760-942-1472 4
1824 • DART Andrew S 760-942-0311
1825 • WONG Frank OO 0
1828 • OLDHAM Delbert OO 9
1829 • COGLIN Edward OO 4
STEVENS Laurie 760-943-1318 4
1830 • PENTALA Erhard OO 2
1831 • ZEELER Mark OO +6
1832 XXXX OO
1835 XXXX OO
1836 ACEVEDO Carlos 760-436-3292
1837 XXXX OO
1838 • BOURGO Linda OO 1
X MOORGATE RD
★ 0 BUS 25 RES 1 NEW

MILBURY RD 92129 SAN DIEGO

WEALTH CODE 8

X CARMEL VALLEY RD
8815 • BLACK Florence OO +6
8820 • FERNANDEZ Keith OO
8825 • NORDSTROM J W 858-484-6380 4
8830 • BHATIA Dilip OO 8
X AMBY CT
8845 • HARTMAN Mark 858-484-3286•
8850 • DORTEZ Eduardo OO 8
8855 • PERESSINI Mark OO 4
8865 • WINN Michael J 858-558-0879
★ WINN MICHAEL J CPA 858-538-1256
8875 EGGLESTON E 858-484-8534 +8
• OLSEN Mark 858-538-8850 +8
8880 • LABAYEN Edward OO 0
8885 • KIM Naresh 858-538-4001 3
8895 • HOOSHMAND Ramin OO 1
8915 XXXX OO
8925 • PATTERSON James OO 2
8935 • STEMPNIAK Mariusz OO 6
X NEWMONT DR
★ 1 BUS 16 RES 3 NEW

MILE HIGH RD 92036 JULIAN

WEALTH CODE 5

17148 XXXX OO
17158 • ZALBI Cyndee OO 1
17166 BOND Mary 760-765-2657 4
17170 XXXX OO
17180 XXXX OO
17194 • DAVIS Deborah OO 4
X FIRE TRL
★ 0 BUS 6 RES 0 NEW

MILETUS WAY 92056 OCEANSIDE

WEALTH CODE 5

X LEISURE VILLAGE WAY
4704 • STEPHENS Harold OO 4
4708 • JONES Theresa OO • 2
4711 • EDWARD M OO +8
JAMES Agnes 760-945-8157•
4712 • DIONNE Margaret A 760-724-2221 8
4716 • HARWOOD Marvin OO 4
LEE Lyle 760-941-7091 4
4718 • ARNETT Don 760-941-1485 0
4723 • DOBBIN Donald 760-758-0868 0
4724 XXXX OO
4728 ZISON Ralph 760-940-1387
4731 THARP K 760-940-1174 4
4732 XXXX OO
4736 • EAKS Arthur 760-643-2241 4
4739 SCHENKER Irwin W 760-724-2122 4
4740 COMSTOCK Patrick B 760-945-0798
4743 • ALANI Robert OO +6
4744 XXXX OO
4747 • BREHOVE Dorothe 760-940-4118• 2
4751 BRASHER Donna 760-414-1289 4
4755 XXXX OO
4759 KEITH Patricia 760-758-2287 4
4760 MCGEE John W 760-758-7309
4763 BELPREZ Richard 760-295-1431 4
4764 • WELER B J 760-631-1929 0
4767 • HERMAN Erwin 760-729-9652
4768 XXXX OO
4771 WALKER John M 760-728-3168
4772 XXXX OO
4775 WEISS Harold 760-941-7273
4778 NEWMARK Helen 760-758-6961
4779 • CORCORAN Francis P 760-630-0805 2
4780 • VELASCO Anyamo OO 4
4784 XXXX OO
4787 • POPE Kenneth 760-726-3726 0

4768 • NICODEMUS Gene H 760-945-8072
X LEMNOS WAY
★ 0 BUS 36 RES 2 NEW

MILFORD PL 92010 CARLSBAD

3511 • PETERSEN Jerrold OO 1
3515 HIRSCHL M 760-720-0457
HIRSCHL T 760-720-0457
3519 • GARMON Brooke OO 4
3525 • BROWN Jarrels OO 0
GARZA Sandra 760-729-7801 4
3527 • VANDERPOOL Paul A 760-434-8918
3531 • ANDERSON Robert OO 1
RAMOS Jennifer 760-730-8771 4
X TAMARACK AVE
X SEABURY ST
3606 • ELDER Richard OO 1
3608 • KITABSZIAN Chesmas OO 8
3610 • STEWART Hazel OO 0
3612 • DONOHUE Stephen OO 0
3614 • MOORE Brian OO 4
3615 • DREBLOW Daniel OO 4
3616 • SCHUSTER Erik OO 7
3617 • AFTANDILIAN Julie OO 4
3619 LEE G 760-730-0389 +6
• SMITH Jennie OO 4
3620 • WALKER Kevin 760-720-1671 0
3621 • LEE Linda OO 0
3622 • LADLEY Stephen OO 8
3623 • EUGENE E OO +6
3624 • CLARK Philip OO 2
3625 • BROADMEADOW John 760-434-7614 3
3626 XXXX OO
3627 • LAYNE Douglas OO 4
3629 • SULLIVAN James OO 0
★ 0 BUS 28 RES 2 NEW

MILISSI WAY 92056 OCEANSIDE

WEALTH CODE 5

5006 • ROLLAND Bruce 760-726-7042 7
5010 • BRUNSON Thomas OO 2
5011 • NEILL Virginia OO 4
5014 • SPRAGUE Alan OO 4
5018 • HAWLEY Lynn 760-945-9928
• HAWLEY Lynn 760-945-9107
5018 • ROSE Daniel OO 4
5019 • BRADFORD Peyton OO 4
5022 • JOHNSON Dean OO 4
5026 • SPAFFORD Arthur 760-940-8404 0
5027 • RICHTER David OO 5
5031 • VANOVER Tom OO 5
5034 • HANSEN Roy OO 8
5035 • GILLEN Paul OO 6
5053 • WOOD Robert OO 4
5039 • BAILEY James OO 0
5042 • MEADOWS Paul OO 8
5046 • PEREZ Alfredo OO 3
5050 • GROSSMITH Lars OO 4
5054 • BELBER Steve 760-639-0080 1
5058 • DELGADO Eyval F 760-758-9189 1
X PATRA WAY
★ 0 BUS 21 RES 0 NEW

MILL CREEK RD 92061 PAUMA VALLEY

WEALTH CODE 4

33107 • HARTMAN Frank OO 4
33113 REDDING Steve 760-742-4388
• SMITH Jan E 760-742-4285
33120 • STENERSON Fred OO 2
33123 HENR Medlen 760-742-3627 4
HURT Helen 760-742-3011 4
33132 • DEWALT Charles W Can 760-742-3637 9
33141 • NEJO Beanie OO 4
33153 • TURNER Tahmeil OO +6
33217 • MCKILLICAN Joan 760-742-3123 4
33221 • MCEVOY Edwin OO 4
33224 XXXX OO
33245 • BERMAN Mary 760-742-0383 4
33251 • CALKINS Georgia 760-742-2481 4
33265 • FRITZ Peter L 760-742-4611 0
★ 0 BUS 15 RES 1 NEW

MILL CREEK RD (05) 92130 SAN DIEGO

5503 • LOUPIAS Pascal OO 4
5507 • KALVA Raju OO +6
5511 • MAHDAVI Saïd OO 4
5515 • FAN Yonying OO 4
YAO Shaomin 858-509-2821 4
5516 • WICKHAM Kurt OO 4
5519 • SUN Chih OO 4
5522 • SIMS Robert OO 4
5523 • MA Yawei OO 4
5527 • LI Dewei OO 3
5528 • HSIAO Yir OO 4
5531 • YUAN Richard OO 4
5532 • REINICK David OO +6
5535 • MILANI Behelle OO 4
5536 • BOSSINGER Scott OO 4
5538 WU Xiao Wei 858-720-9863 4
• YU Tiele OO 4
5540 • PARK Chi Hong 858-792-0870 1
5543 • SHIN Kenneth OO 4
5544 • LALINGUS Bobbie OO 4
5548 HADDAD Kamal 858-259-2226 4
• RYB Misha OO 4
5552 • DALTON Rex 858-755-3999 4
★ 0 BUS 23 RES 2 NEW

MILLAGRA DR (01) 92028 FALLBROOK

WEALTH CODE 6

X TECALOTE DR
4004 • ROSELL Glenn OO 4
4007 • BERGERUD Larry OO 4
4014 • SHEFFER Ronald 760-451-0333 1
4018 • COPELAND Dana OO 0
4026 • HICKS Ray C 760-728-3848 1
4047 • YUN Daniel OO 2
4055 • CROMER Donald OO +6
4060 HALICK T D 760-728-0958 +6
4095 CASEY Terry 760-451-9095 4
• TOMA Gary OO
★ 0 BUS 10 RES 2 NEW

MILLARDS RANCH LN 92064 POWAY

WEALTH CODE 8

X ACTON AVE
13753 • CONGER George OO 1
13807 • KOVAL Edward 858-513-8044 4
13845 • BARRY Robert OO • 4
13863 • WARD Robert 858-486-2962• 0
X MILLARDS RD
13886 L STEVENSON James E 858-679-1107 1
13880 XXXX OO
X DOS AMIGOS WAY
★ 0 BUS 8 RES 0 NEW

MILLARDS RD 92064 POWAY

WEALTH CODE 8

X MILLARDS RANCH LN
14514 SMITH David A 858-486-1254
14544 ★ PENNER DESIGN 858-748-8582 4
• PENNER Jeffrey OO 4
14591 • BAILEY William OO 0
14574 • KOONINGS Marianne OO 0
X POWAY RD
★ 1 BUS 4 RES 0 NEW

MILLAY CT (03) 92008 CARLSBAD

WEALTH CODE 7

5061 • CISTERNAS Ricardo OO 4
5064 • NELSON Elizabeth 760-431-1800 4
5065 • EHLERT Scott OO 4
5068 • LONG William OO 4
5068 • MEHTA Jay M 760-804-0034 3
5069 ★ ABOBNT BUSINESS SOLUTIONS 760-431-8790 5
• BURKE David T 760-918-1928 3
5063 • ROJAS Alejandro 760-431-2303 4
• ROJAS Alejandro 760-918-0268 4
5065 • WANG Guangyi OO 3
5067 • EDWARDS Terri 760-438-7871 3
5070 • BANTLE Kurt OO 4
5071 • ESSMAN Christopher 760-438-6245 3
5074 • PATEL Mahesh OO 4
5073 • STORRS Angela 760-431-9144 3
5078 • KNOWLAND Adam OO 4
X MARWIN DR
★ 1 BUS 15 RES 0 NEW

MILLBROOK PL 92026 ESCONDIDO

WEALTH CODE 5

X N FIG ST
811 • MELARA Eduardo 760-480-7802 0
• MELARA Evelyn J 760-741-7809 0
829 • LEE Wilson OO 3
821 • NGUYEN Nina OO 0
831 • NIETO Jose 760-745-1793 9
841 • HUYNH David OO 4
850 • ANGUIANO Magarita 760-233-5822 1
851 WILLIAMS Steve 760-746-0922
860 • HARTZLER Edwin OO 6
861 • MAHONEY Tomasie OO 4
870 JACKSON Deborah 760-747-8163
871 • ALVAREZ Ramon OO 0
875 • GARTER Susan OO 5
★ 0 BUS 13 RES 0 NEW

MILLCO LN 92082 VALLEY CENTER

WEALTH CODE 5.5

X COLE GRADE RD
14019 • LINAKER John OO 4
X MILLCO WAY
14091 XXXX OO
14119 • VELTRI Joe A 760-749-4329 5
14171 • WHEELER Thomas OO 3
★ 0 BUS 4 RES 0 NEW

MILLCO WAY (97) 92082 VALLEY CENTER

WEALTH CODE 5

X MILLCO LN
29820 ELLIOTT Russell L 760-749-0433 7
29597 SCHWARZ Betsy 760-749-0653 4
★ 0 BUS 2 RES 0 NEW

MILLCROFT CT 92130 SAN DIEGO

WEALTH CODE 9

13170 XXXX OO
13171 GAVRANIAN Vahan 858-259-1983 8
13180 XXXX OO
13181 • FARRAND Gregory 858-481-8642
13190 GOTZ David 858-755-2057
X OVERPARK RD
★ 0 BUS 5 RES 0 NEW

MILLEGAR LN 92084 VISTA

WEALTH CODE 5

X MIRA SOL DR
2424 • RESCH Scott OO 4
2428 • BROUSSARD David OO 8
2430 • COLENDO Alfred OO 0
2434 • ESSLE Dennis OO 8
2440 • BETHUNUM Carla OO 4
★ 0 BUS 5 RES 0 NEW

MILLENIUM CT (04) 92065 RAMONA

WEALTH CODE 7

1001 XXXX OO
1004 • LANGHOFF Dan OO 4
1047 • TOOTHACRE Scott OO 3
1050 • SHERBONDY Stephen OO 0
★ 0 BUS 4 RES 0 NEW

MILLER AVE 92025 ESCONDIDO

WEALTH CODE 6

X MONTVIEW DR
1910 • JIMENEZ Sergio OO 8
1912 XXXX OO
1916 • PRESTON Alma OO 3
1920 XXXX OO
X DANICA PL
1935 • CLINE Daniel E 760-795-4965 8
1936 AGUILAR S 760-735-9871 4
• REZNICHEK Robert OO 0
1946 • STOWERS Mark 760-738-8650 2
1950 • PIERCE Mark OO 0
1956 • KEATON-BALLARD Ellen OO 5
1968 • WALTERS Gerald OO 8
1978 ★ ESCONDIDO SC MILLER EC 760-432-2479
★ MILLER SCHOOL 760-432-2479
★ YMCA OF SD CO MILLER ELEM 760-739-8327
1976 • MILES Kim OO 8
1988 CAMPOS Martinez Alberto 760-735-9440 +6
• FERNANDEZ Flor OO 5
X BROTHERTON RD
2010 • MITCHELL Brian OO 3
2031 VALDEZ John Eduardo 760-745-7273
2047 BAKER Karen 760-746-6373
2050 XXXX OO
2053 • REYNOSO Carolyn OO +6
2060 • CLAQUE Brian OO 0
2073 • MENDEZ Richard OO 8
X MCDONALD LN
2181 • MARTINEZ Ariel 760-743-6851 0
2183 • BURNHAM Nancy OO 4
2185 • GALPERIN Michael OO 4
2105 • STEELE Christopher OO 3
2140 • HORTON Lisa OO 0
X W CITRACADO PKY
★ 3 BUS 26 RES 2 NEW

MILLER AVE 92029 ESCONDIDO

WEALTH CODE 6

2315 • OGIVARO Frank OO 1
2323 STEINMETZ Andrew 760-294-1201 +6
• VIGLIOTTI David OO
2345 XXXX OO
2353 • HAMMERLING Philippe OO 4
X HAMILTON LN
2516 ★ EB PRODUCE 760-735-8818 7
ISHAM Xochitl 760-741-0224 4
2558 • HENDRICKSON S 760-480-1989 4
2578 HAMILTON Bruce 760-747-8810 4
• ZIEGLER Kenneth OO 0
2604 XXXX OO
2620 • SCHWAB John 760-738-8175 2
2628 XXXX OO
2634 • EPSTINE Peter OO
2636 WEATHERS E J 760-747-2611
2650 CANO Ted 760-746-9489 4
• MALDY Dennis OO 4
2665 • HORTON Fred 760-743-7580
• HORTON Fred 760-743-7582
2708 CONLEY Everett 760-745-2850
2712 • LEWIS Roger W 760-746-9223
2724 • KOKAMI Bushiro OO 2
2732 SPIBAK Shelley 760-737-0112 3
• WARRICK Stephen OO 2
X FELICITA RD
★ 1 BUS 23 RES 1 NEW

MILLER LN 92082 VALLEY CENTER

WEALTH CODE 5

X MILLER RD
28312 XXXX OO
28916 XXXX OO
29022 • GARCIA Leticia 760-749-5482 4
28937 • SANDOVAL Victor OO +6
29940 XXXX OO
29945 • SMITH Douglas OO 0
29957 • CROUCH James OO 4
30003 • SLOCUM David OO 9
30020 • HUFFMAN Robt 760-749-2249
30021 • HUFFMAN Robert OO 0
30025 • MANN Robert OO 0
30028 • HUFFMAN Robert OO 0
30048 • CALHOON Michael OO 0
XAMINSKI Helina 760-749-4067 4
X COLE GRADE LN
★ 0 BUS 14 RES 1 NEW

MILLER RD 92082 VALLEY CENTER

WEALTH CODE 5.3

28637 • BROWN Stephen OO +6
28680 ★ MURPHY'S SANDBLASTING 760-749-6611 7
PUGH William 760-749-2583 2
28655 • NORDSTROM Carl 760-749-0921
28682 • BALDWIN Paul A 760-751-8061
X JAKE RD
X BLUE SAGE LN
28915 • FORD Ronald OO 9
28948 • HOLMEN Nils OO 1
28963 ★ VALLEY CENTER CEMETERY DIST 760-749-1185
X LITTLE CREEK LN
29012 • BROWN Walter 760-749-8013
29028 ★ JEHOVAH'S WITNESSES-KINGDOM HALL 760-749-2883
29035 • ROMER Michael OO 4

29030 DOMINGUEZ Juan 760-749-8847 4
GARCIA Rafael 760-749-8378
29048 HEGLAND Michael 760-751-2432 +6
• PRICE Pamela OO 9
29059 • EASTMAN Sharla A 760-751-1711 4
X MISTY OAK RD
29133 • REVELES Sergio OO 2
X OAKWOOD GLEN PL
29200 • ALEN Keith 760-751-3346 2
29235 • VILLALOBOS Lupe OO 8
29267 CRAIG Robin 760-751-1249 4
29317 • RATTERREE Jerry OO 8
29347 WRIGHT J G 760-749-1234
29362 CORCORAN Judy 760-749-8196 +6
29398 ★ CAMPOS ALFREDO 760-751-8847 4
• CAMPOS Cosgues 760-749-3611 4
X SHADY CREEK RD
29409 • HAYNES Michell OO 9
X LITTLE POND RD
29458 • BERGER Michael OO 4
29467 • BUDVARSON Thomas OO 4
★ BUDVARSON THOS E 760-749-8445
★ COUNTRY AIR ENERGY 760-749-8444
29475 • RUSSELL Dale 760-749-3861 3
29481 HENRY Burdell 760-749-1917
29489 • THOMAS Kristie 760-751-9863 2
29494 • COE Robert OO 4
29498 CRIPE Adam 760-751-0179 4
HELM David 760-749-7821 4
• NICKLAS David OO +6
29504 GRAVES Jan 760-749-0484
29549 • DIAZ Charlotte OO 0
29551 • STEWART Michael 760-749-2281
29563 FIVEL Ernest 760-749-4322 4
29573 • CAPARELLI James OO 4
29577 • HENDRICKS Terry R 760-749-0399
29631 • CLAY Justina 760-749-5905
★ MAYER LOCATING DOT COM 760-749-0802 +6
29632 XXXX OO
29643 • LARSEN Janet OO 4
29644 • CRAYCHEE Theresa OO 0
29681 BLAKEMAN Geo 760-749-1926
29747 XXXX OO
X MAUDE RD
29760 • SANCHEZ Javier OO +6
29815 • RODENCAL Dorothy OO 9
29840 • LISS Ira OO 3
29842 CRAVEN Christopher 760-751-1499 +6
X QUAIL HOLLOW LN
29850 • REID Ernest OO 0
YRETA Teresa 760-749-7185 6
29853 • VOSEFSKI Marc OO 2
29879 RIOS Arturo 760-749-6414 4
• ZUNIGA Antonio OO
29880 ★ PHROUS HOLDINGS INC 760-749-4163 4
X MILLER WAY
X MILLER LN
29958 GIUFFREDINI Leonard 760-749-1595
29958 REED M W 760-741-1171
30010 • OCONNOR Patrick OO 3
30033 • CORDABA Eustorgio 760-749-8881 +6
30053 ★ VALLEY BAPTIST CH 760-749-2851
X COLE GRADE RD
30111 • HOLMES Brian 760-749-8804 2
30118 XXXX OO
30122 XXXX OO
30130 • BARCENAS Isauro 760-751-8741 4
SIGHMELLER Ric 760-751-8822 4
30133 • BOOKOUT William 760-751-3087 3
★ GENESIS LIMITED 760-751-8822 4
30134 XXXX OO
30136 XXXX OO
30137 • POLITES John 760-749-7750 3
30138 CORDER Sybil 760-749-8638 +6
30142 ARIAS Erica J 760-751-5492 +6
30207 • SHUMAKER Richard R 760-749-2220
30215 • PODE Candice OO 4
30232 NORELL Frank A 760-749-3451•
30258 KOWAL Andrew 760-749-8434 +6
POE R N 760-749-2858 0
30281 DONALDSON Lee 760-749-8822 2
• PERALTA Oscar 760-751-1318 4
30256 • HERNANDEZ Sergio OO 4
30270 • LECHLITER Michael OO 4
★ MARINER POOLS & SPA 760-749-2278
30303 • KNIGHT Robert OO 0
30309 • BARBER Harry 760-749-2088 3
30310 • PULIDO Leslie OO 8
SHOCKEY Lisa K 760-749-1003 4
30339 CERVANTES Silvestre 760-749-6630 +6
30353 • SEDINA Chad L 760-749-8319
30355 • NILO Lantine OO 1
30358 GRATZKE Patricia J 760-749-3138
• HADLEY Steve M 760-749-1908
30411 • ANTONELLO Kristy 760-751-0859 +6
30418 VELEZ Sonia 760-751-7322 4
30421 • GRISSOM Larry David 760-749-3212 9
• GRISSOM Larry David 760-749-1285 9
30422 • FINK Jennie 760-749-9730
• FINK Kirk 760-749-0287
30434 • BARRERA Ignacio OO 9
30438 • WILLIAMS Leslie OO 9
30458 • DENELDE John OO 8
30440 • BOWEN Hilda H 760-749-1360
30442 • CHRISTIE Tom OO 8
30448 • PAMATZ Pedro OO 4
30450 LOPEZ Miguel 760-749-9405 4
• RIZZOTTO Mario 760-751-4803 3
30461 BIX Max 760-751-4108 4
X WILHITE LN
30536 • BARRETT Patrick D Jr 760-749-1221
JUAREZ Martin V 760-749-0504 1
30539 • COLEMAN M 760-749-7133 1
30658 ★ BARRETT BUMAZER ARABIANS 760-749-1407
★ BARRETT PATRICK D JR 760-749-1407
★ BARRETTS COUNTRY STORE 760-749-1407
★ BARRETTS BUMAZER ARABIANS 760-749-1407
30655 XXXX OO
30693 • GREHL Sally 760-751-8365 4
30695 • SHOEMAKER Wm 760-749-3597
30620 XXXX OO
30653 • CHESTER Robert OO 9
★ 15 BUS 106 RES 13 NEW

MILLER WAY 92082 VALLEY CENTER

WEALTH CODE 5

13820 MELENDEZ Felipe 760-751-1878 4
MELENDEZ Felipe 760-749-4582 4
SCHOSTAG L N 760-749-1132
SCHOSTAG R J 760-749-1132
X TORINO CT
13814 GRANADOS Robt G 760-749-8032

13980 • CLARK Randy OO 1
UBBEN Bruce 760-749-8465 4
13913 • HERMAN Larry 760-749-1446
X NAGORSKI LN
★ 0 BUS 6 RES 0 NEW

MILLIKIN AVE 92122 SAN DIEGO

WEALTH CODE 7.6

X REGENTS RD
3214 • GILES John OO 0
3225 • RAMEY Gary 858-597-4538 0
3226 FARAHMEHR Mary 858-453-2820 4
• MALEK Ali OO 4
3236 • KLIGMAN Marc J 858-458-1074 4
3250 KOBEY Kara 858-623-0272 2
• MORTON Charlotte OO 5
3255 • REMILLARD Thomas OO 4
3262 • KANTAK Prashant 858-638-7585 0
2274 FRIEDMAN Sidney J 858-453-3348 +6
X WILLARD ST
3298 • DUDINE Patricia OO
X HURD CT
3310 • TODD James OO 0
3322 • YOUNG William OO 8
3334 • GALGUT Barry 858-455-0731
3348 • MCDANIEL David OO 3
3358 FIRST Howard Mrs 858-457-3674
★ FIRST MRS DR 858-457-3674
• FIRST S 858-546-0711
3370 • SHEIN Alan 858-535-1754
3382 • MIZAN Shabbey OO 0
3394 • MANN Stacy OO +8
SMITH Stacy 858-457-2907
3418 • TRIFFON Douglas OO 3
3419 • LICHTENSTEIN Angelica OO • 0
3426 • BAGHERI Mohsen OO 0
3438 XXXX OO
3446 • MILLER John D 858-457-0845
3458 • KOTENKO Frederick OO 0
3478 • KERN Richard OO 0
3488 YATES Ralph 858-597-1229
3486 JACOBY Irving 858-457-0628
• JACOBY Sam 858-546-9018
X OHM CT
3505 KELMAN Arik 858-546-0155 +6
KELMAN Arik 858-546-9270 +6
3511 • ALLEN Janice 858-623-8511
3516 • RAYA Ruth OO +6
3520 • CARMODY Brian OO 8
3531 • WEBBER Stephen OO 8
3536 • HOU Tieng 858-457-5468 5
3546 • HAGEMAN Douglas L 858-552-9271
3556 • ZBK Edw 858-458-0056
3561 • ROCHE Philippe OO 4
3571 • WILDEN Patricia 858-552-8378 1
3576 • KOHLENBERG Charles OO • 3
X MERCER ST
3626 • KERESZTELY Mihaly OO 2
3628 • VILLA Rich OO 0
3633 ★ TRI-TEK ENERGY CONSULTING 858-453-6483 9
• WHITE David OO 6
3636 BAREFIELD B 858-452-9846 +6
3641 • COHEN Jose OO 6
3648 • HASSON Shinahon OO 4
3649 • ELWELL Gene OO 0
3657 • BARHAM Philip OO 9
3658 • VANDORN Richard OO 3
3665 • RABONESI Altagracia OO 0
SARKISOV Artur 858-731-1878 +6
X DENNISON ST
3673 • EYRES Russell R 858-453-3044
3681 • LABLE Gilbert 858-459-1300 4
3691 • GALVAN Raymond OO 3
X CASCADE ST
3707 • OLIVERA R OO 4
3712 • HANSEN David OO 4
3715 • WHIDBEE Howard OO 8
3720 KNAPP Leland 858-453-4296
3723 RIOS Reimundo 858-457-3178 4
3728 • BRYAN John OO 2
3731 • VERMEY Yvonne OO 4
3736 • SACIO C 858-453-9232 9
• SACIO J 858-453-9232 9
3739 KELLY Martha 858-458-9898 +6
• LUKEN Carmen OO 2
3747 XXXX OO
3752 • NEWMAN Elly 858-453-4987
3756 • WARD Donald L 858-453-3692
3760 • SHAPIRO Vitali OO 0
3763 • FAY Ronald OO 0
3768 ROTH Thos H 858-452-9967
3771 XXXX OO
3776 • ROSENBERG Joel OO 4
3779 • MAHDON Raiel OO +6
3784 DUBAN Wayne 858-550-8716 +6
3787 • BOBB Marjorie T 858-535-9186 2
X RADCLIFFE DR
3815 • PENDLETON T H Jr 858-453-6477 2
3835 • OGRADY Charles OO 4
O'GRADY Chas J 858-453-4342
3858 XXXX OO
3875 • BAUER George OO 8
3878 • CROSSMAN James OO 6
★ 2 BUS 65 RES 10 NEW

MILLPOND WAY 92129 SAN DIEGO

WEALTH CODE 6

13565 SANTI Ralph L 858-538-4086
13571 • DOOLEY Roger OO 4
PIERAMICO Nady 858-484-3448 6
13572 XXXX OO
13576 • FEDERSON Carol 858-538-7401
13579 XXXX OO
13580 • CARTER Carol OO 0
13581 • TUCKER Alan 858-538-5822 3
13584 • CLIFFORD Henry OO • 2
13585 • ZARBURIN J 858-780-0380 4
• ZARBURIN R 858-780-0380 4
13586 • NUGENT James OO 4
13591 • OLEARY James OO 8
13592 • IBANEZ Carlos OO 8
13595 • WHITNEY Stephen G 623-484-8044
13576 • HETHERINGTON David OO 0
★ 0 BUS 16 RES 0 NEW

MILLS CT (97) 92069 SAN MARCOS

WEALTH CODE 5

X DEAVERS DR
1617 • CAO Kevin OO 0

⊗=DO NOT MAIL

Haines Company, Inc.

PATRA WAY 2006

X ST ALBANS DR

X WOODLEY PL

X SIDONIA ST

★ 5 BUS 67 RES 1 NEW

PASSING LN 92065 RAMONA

WEALTH CODE 4

X JULIAN RD

★ 0 BUS 2 RES 0 NEW

PASSY AVE 92122 SAN DIEGO

WEALTH CODE 5

X LORD CECIL ST

X HABER ST

★ 0 BUS 2 RES 0 NEW

PASTEL CT 92057 OCEANSIDE

WEALTH CODE 4

X MONTAGE RD

★ 0 BUS 11 RES 0 NEW

PASTERNACK PL 92123 SAN DIEGO

WEALTH CODE 6

X GRAMERCY DR

★ 0 BUS 34 RES 2 NEW

PASTEUR CT (00) 92008 CARLSBAD

WEALTH CODE 4

X ASTON AVE

★ 5 BUS 0 RES

PASTORAL RD 92128 SAN DIEGO

WEALTH CODE 2.6

X GALLADO RD

X ACEBO DR

X PINATA DR

X BERNARDO OAKS DR

★ 0 BUS 36 RES 5 NEW

PASTORAL WAY 92078 SAN MARCOS

X BLUESAGE DR

X MONTURA RD

★ 0 BUS 5 RES 0 NEW

PATHOS CT 92129 SAN DIEGO

WEALTH CODE 8

X PATHOS LN

★ 0 BUS 8 RES 0 NEW

PATHOS LN 92129 SAN DIEGO

WEALTH CODE 8

X RAGWEED ST

X FOUCAUD WAY

X DAUCUS CT

X BURR LN

X PATHOS CT

★ 0 BUS 46 RES 5 NEW

PATINA CT 92057 OCEANSIDE

WEALTH CODE 4

X GALLERY DR

★ 1 BUS 27 RES 1 NEW

PATINA CT 92131 SAN DIEGO

WEALTH CODE 8

X FRANK DANIELS WAY

★ 1 BUS 25 RES 1 NEW

PATINA ST (99) 92127 SAN DIEGO

WEALTH CODE 9

X RUSSET ST

★ 0 BUS 35 RES 4 NEW

PATMOS WAY (00) 92056 OCEANSIDE

WEALTH CODE 6

X LEISURE VILLAGE WAY

X PIROS WAY

★ 0 BUS 32 RES 3 NEW

PATRA WAY 92056 OCEANSIDE

WEALTH CODE 5

X PIRGOS WAY

X MILISSI WAY

★ 0 BUS 20 RES 1 NEW

PATRICIA CIR 92084 VISTA

WEALTH CODE 7

X PATRICIA LN

★ 0 BUS 6 RES 0 NEW

PATRICIA LN 92084 VISTA

WEALTH CODE 7

X EUCALYPTUS AVE

X PATRICIA CIR

★ 0 BUS 8 RES 0 NEW

PATRICIA RD (04) 92082 VALLEY CENTER

WEALTH CODE 4

X CARNEY LN

★ 0 BUS 2 RES 0 NEW

PATRIOT ST 92124 SAN DIEGO

WEALTH CODE 1.9

X TAUSSIG ST

X MINUTEMAN ST

X SALMON ST

★ 0 BUS 22 RES 13 NEW

PATTERSON RD 92027 ESCONDIDO

WEALTH CODE 6

X MOMAR LN

X S CITRUS AVE

X HAVEN PL

X RAINBOW PL

★ 1 BUS 11 RES 0 NEW

PATTI DR 92084 VISTA

WEALTH CODE 3

X GOODWIN DR

★ 0 BUS 2 RES 0 NEW

PATTON LN (04) 92028 FALLBROOK

WEALTH CODE 5

X DE LUZ RD

★ 0 BUS 1 RES 0 NEW

PATTON OAK RD (04) 92028 FALLBROOK

★ 0 BUS 2 RES 0 NEW

PATTY HILL DR 92075 SOLANA BEACH

WEALTH CODE 7.3

X N RIOS AVE

X BARBARA AVE

X N GRANADOS AVE

★ 0 BUS 4 RES 0 NEW

PATTY LN 92024 ENCINITAS

WEALTH CODE 4

X HYGEIA AVE

★ 0 BUS 4 RES 0 NEW

PAUL BARWICK CT 92126 SAN DIEGO

WEALTH CODE 6

X MASON HEIGHTS LN

★ 1 BUS 12 RES 0 NEW

PAUL JONES AVE 92117 SAN DIEGO

WEALTH CODE 4.4

X MORENA BLVD

X BUNKER HILL ST

X BRANDYWINE ST

★ 2 BUS 31 RES 5 NEW

PAUL ST 92027 ESCONDIDO

WEALTH CODE 5

X KINGSTON DR

X KENORA ST

★ 0 BUS 19 RES 1 NEW

PAULA ST 92027 ESCONDIDO

WEALTH CODE 3

X MEDFORD AVE

X MEDFORD PL

X MONTEMAR AVE

X LEE AVE

X E LINCOLN AVE

★ 1 BUS 21 RES 0 NEW

PAULA WAY 92027 ESCONDIDO

WEALTH CODE 5

X BELKNAP WAY

X JEFFREY AVE

X STANLEY WAY

★ 1 BUS 23 RES 3 NEW

PAULANN CT (04) 92028 FALLBROOK

★ 0 BUS 8 RES 3 NEW

PAULINA TER 92064 POWAY

WEALTH CODE 9

★ 0 BUS 2 RES 0 NEW

PAULINE WAY 92058 OCEANSIDE

WEALTH CODE 1

X BEDFORD AVE

X SALMON RIVER RD

★ 1 BUS 128 RES 9 NEW

PIPIT CT 92011 CARLSBAD

★ 0 BUS 5 RES 1 NEW

PIPIT CT 92129 SAN DIEGO

WEALTH CODE 8

X PIPIT PL

★ 0 BUS 8 RES 0 NEW

PIPIT PL 92129 SAN DIEGO

WEALTH CODE 8

X DORMOUSE RD

X SALVIA WAY

X PIPIT CT

X LICIA WAY

X PIPIT WAY

★ 0 BUS 69 RES 3 NEW

PIPIT WAY 92129 SAN DIEGO

WEALTH CODE 8

X PIPIT PL

★ 0 BUS 6 RES 0 NEW

PIPO RD 92128 SAN DIEGO

WEALTH CODE 4

X SARAPE DR

X ROCA DR

★ 0 BUS 11 RES 0 NEW

PIPPIN CT (00) 92078 SAN MARCOS

X CIMA DR

★ 0 BUS 10 RES 2 NEW

PIPPIN DR 92028 FALLBROOK

WEALTH CODE 8

X OLD STAGE RD

X SENWOOD WAY

X KIEL RD

★ 0 BUS 35 RES 4 NEW

PIRAEUS ST 92024 ENCINITAS

WEALTH CODE 6

X OCEAN VIEW AVE

X NORMANDY RD

X SPARTA DR

X OLYMPUS ST

X PLATO PL

★ 0 BUS 7 RES 1 NEW

PIRAGUA ST 92009 CARLSBAD

WEALTH CODE 8

X VENADO ST

X CADENCIA ST

X ESFERA ST

X TRIGO LN

★ 2 BUS 42 RES 1 NEW

PIRE AVE 92122 SAN DIEGO

WEALTH CODE 9

X CURIE ST

★ 0 BUS 18 RES 2 NEW

PIRGOS WAY (00) 92056 OCEANSIDE

WEALTH CODE 5

X MYSTRA WAY

X PATRA WAY

X TOLO WAY

★ 0 BUS 9 RES 2 NEW

PIRINEOS WAY 92009 CARLSBAD

WEALTH CODE 6

X VIEJO CASTILLA WAY

2607 . . . . . APARTMENTS

2626 . . . . . APARTMENTS

2630 . . . . . APARTMENTS

★ 1 BUS 119 RES 10 NEW

PIROS WAY (00) 92056 OCEANSIDE

WEALTH CODE 5

X CORINTHIA WAY

X PATMOS WAY

★ 0 BUS 25 RES 0 NEW

PISCES WAY 92128 SAN DIEGO

WEALTH CODE 7

X LYNX RD

X ARA PL

X PERSEUS RD

★ 0 BUS 11 RES 1 NEW

PISMO BAY CT 92057 OCEANSIDE

WEALTH CODE 4

X MARBLEHEAD BAY DR

X CARDIFF BAY DR

★ 0 BUS 6 RES 1 NEW

PISMO CT 92109 SAN DIEGO

WEALTH CODE 8

MISSION BEACH AREA

X OCEAN FRONT WALK

X STRAND WAY

X MISSION BLVD

X BAYSIDE LN

X BAYSIDE WALK

★ 3 BUS 35 RES 2 NEW

PITMAN PL 92027 ESCONDIDO

WEALTH CODE 3

X LEE AVE

X MARK PL

★ 0 BUS 5 RES 1 NEW

PITMAN ST 92027 ESCONDIDO

WEALTH CODE 3

X E WASHINGTON AVE

X SCOTT WAY

X HOLLY AVE

X WALTON WAY

X E MISSION AVE

★ 1 BUS 84 RES 2 NEW

PIUTE PL 92117 SAN DIEGO

WEALTH CODE 3,8

X ONONDAGA AVE

X WILLAMETTE AVE

★ 1 BUS 35 RES 1 NEW

PIUTE TRL 92036 JULIAN

WEALTH CODE 5

X YAQUI DR

★ 0 BUS 6 RES 0 NEW

PIZARRO LN (03) 92026 ESCONDIDO

WEALTH CODE 7

★ 0 BUS 25 RES 2 NEW

PIZARRO PL (04) 92084 VISTA

WEALTH CODE 7

X SMITH DR

★ 0 BUS 4 RES 0 NEW

PIZZO LN 92028 FALLBROOK

WEALTH CODE 8

X MORRO RD

★ 0 BUS 8 RES 0 NEW

PLACE MONACO 92014 DEL MAR

WEALTH CODE 9

★ 1 BUS 4 RES 0 NEW

PLACER AVE 92069 SAN MARCOS

WEALTH CODE 4

X AUBURN AVE

●=DO NOT MAIL

APPENDIX E

OTHER AGENCY DOCUMENTS
SANBORN MAPS, ENVIRONMENTAL LIENS

APN 169-562-01-00
4000 MYSTRA WAY
OCEANSIDE, CA 92056

Inquiry Number: 4958705.8
June 06, 2017

EDR Building Permit Report

Target Property and Adjoining Properties

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EDR BUILDING PERMIT REPORT

About This Report

The EDR Building Permit Report provides a practical and efficient method to search building department records for indications of environmental conditions. Generated via a search of municipal building permit records gathered from more than 1,600 cities nationwide, this report will assist you in meeting the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

Building permit data can be used to identify current and/or former operations and structures/features of environmental concern. The data can provide information on a target property and adjoining properties such as the presence of underground storage tanks, pump islands, sumps, drywells, etc., as well as information regarding water, sewer, natural gas, electrical connection dates, and current/former septic tanks.

ASTM and EPA Requirements

ASTM E 1527-13 lists building department records as a "standard historical source," as detailed in § 8.3.4.7: "Building Department Records - The term building department records means those records of the local government in which the property is located indicating permission of the local government to construct, alter, or demolish improvements on the property." ASTM also states that "Uses in the area surrounding the property shall be identified in the report, but this task is required only to the extent that this information is revealed in the course of researching the property itself."

EPA's Standards and Practices for All Appropriate Inquires (AAI) states: "§312.24: Reviews of historical sources of information. (a) Historical documents and records must be reviewed for the purposes of achieving the objectives and performance factors of §312.20(e) and (f). Historical documents and records may include, but are not limited to, aerial photographs, fire insurance maps, building department records, chain of title documents, and land use records."

Methodology

EDR has developed the EDR Building Permit Report through our partnership with BuildFax, the nation's largest repository of building department records. BuildFax collects, updates, and manages building department records from local municipal governments. The database now includes 30 million permits, on more than 10 million properties across 1,600 cities in the United States.

The EDR Building Permit Report comprises local municipal building permit records, gathered directly from local jurisdictions, including both target property and adjoining properties. Years of coverage vary by municipality. Data reported includes (where available): date of permit, permit type, permit number, status, valuation, contractor company, contractor name, and description.

Incoming permit data is checked at seven stages in a regimented quality control process, from initial data source interview, to data preparation, through final auditing. To ensure the building department is accurate, each of the seven quality control stages contains, on average, 15 additional quality checks, resulting in a process of approximately 105 quality control "touch points."

For more information about the EDR Building Permit Report, please contact your EDR Account Executive at (800) 352-0050.

EDR® Environmental Data Resources Inc

BUILD FAX PROPERTY HISTORY

EXECUTIVE SUMMARY: SEARCH DOCUMENTATION

A search of building department records was conducted by Environmental Data Resources, Inc (EDR) on behalf of LGCGEOENV on Jun 06, 2017.

TARGET PROPERTY

4000 MYSTRA WAY
OCEANSIDE, CA 92056

SEARCH METHODS

EDR searches available lists for both the Target Property and Surrounding Properties.

RESEARCH SUMMARY

Building permits identified: YES

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Oceanside

Year	*Source*	*TP*	*Adjoining*
2017	City of Oceanside, Development Services		X
2016	City of Oceanside, Development Services		X
	City of Oceanside, Development Services	X	
2015	City of Oceanside, Development Services		X
	City of Oceanside, Development Services	X	
2014	City of Oceanside, Development Services		X
2013	City of Oceanside, Development Services		X
2012	City of Oceanside, Development Services		X
	City of Oceanside, Development Services	X	
2011	City of Oceanside, Development Services		X
	City of Oceanside, Development Services	X	
2010	City of Oceanside, Development Services		X
2009	City of Oceanside, Development Services		X
2008	City of Oceanside, Development Services		X
	City of Oceanside, Development Services	X	
2007	City of Oceanside, Development Services		X
2006	City of Oceanside, Development Services		X
2005	City of Oceanside, Development Services		X
2004	City of Oceanside, Development Services		X
	City of Oceanside, Development Services	X	
2003	City of Oceanside, Development Services		X
2002	City of Oceanside, Development Services		X
	City of Oceanside, Development Services	X	
2001	City of Oceanside, Development Services		X
	City of Oceanside, Development Services	X	
2000	City of Oceanside, Development Services		X
1999	City of Oceanside, Development Services		
1998	City of Oceanside, Development Services		

Year	Source	TP	Adjoining
1997	City of Oceanside, Development Services		
1996	City of Oceanside, Development Services		
1995	City of Oceanside, Development Services		
1994	City of Oceanside, Development Services		
1993	City of Oceanside, Development Services		
1992	City of Oceanside, Development Services		
1991	City of Oceanside, Development Services		
1990	City of Oceanside, Development Services		

BUILDING DEPARTMENT RECORDS SEARCHED

Name: Oceanside
Years: 1990-2017
Source: City of Oceanside, Development Services, OCEANSIDE, CA
Phone: (760) 435-3950

Name: Carlsbad
Years: 2011-2016
Source: City of Carlsbad, Building Department, CARLSBAD, CA
Phone: (760) 602-2700

Name: Encinitas
Years: 1971-2015
Source: City of Encinitas, Planning and Building, Encinitas, CA
Phone: (760) 633-2730

Name: San Bernardino County
Years: 2002-2017
Source: San Bernardino County, Land Use, Building & Safety, FONTANA, CA
Phone: (909) 387-8311

Name: San Diego County
Years: 2013-2017
Source: San Diego County, Development Services, ENCINITAS, CA
Phone: (619) 446-5000

Name: San Marcos
Years: 2007-2017
Source: City of San Marcos, Building Division, SAN MARCOS, CA
Phone: (760) 744-1050 x3241

Name: Vista
Years: 1990-2017
Source: City of Vista, Building Division, VISTA, CA
Phone: 760-726-1340 ext. 12

TARGET PROPERTY DETAIL

4000 MYSTRA WAY
OCEANSIDE, CA 92056

4000 MYSTRA WAY

Date:	**5/23/2016**
Permit Type:	**FIRE**
Description:	**NEW VENTURE CHRISTIAN FELLOWSHIP KIDS WORLD: NON-PERMITTED**
Permit Description:	**FIRE**
Work Class:	FIRE SPRINKLER COMM
Proposed Use:	
Permit Number:	FIRE16-0103
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

Date:	**4/22/2016**
Permit Type:	**BLDG**
Description:	**NEW VENTURES CHRISTIAN FELLOWSHIP KIDS WORLD: NON-PERMITTED**
Permit Description:	**BUILDING**
Work Class:	BLD TI GENERAL
Proposed Use:	NON-STRUCT 800
Permit Number:	BLDG16-1082
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	VIKING COMMERCIAL CONSTRUCTION

Date: **10/12/2015**
Permit Type: **FIRE**
Description: **NEW VENTURE CHRISTIAN PRESCHOOL**

Permit Description: **FIRE**
Work Class: LCF
Proposed Use:
Permit Number: FIRE15-0201
Status: RECEIVED
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **7/16/2015**
Permit Type: **FIRE**
Description: **NEW VENTURE CHURCH**

Permit Description: **FIRE**
Work Class: FIRE SPRINKLER COMM
Proposed Use:
Permit Number: FIRE15-0148
Status: RECEIVED
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **7/16/2015**
Permit Type: **FIRE**
Description: **NEW VENTURE CHURCH**

Permit Description: **FIRE**
Work Class: FIRE HOOD SYSTEM
Proposed Use:
Permit Number: FIRE15-0149
Status: RECEIVED
Valuation: $0.00
Contractor Company:
Contractor Name:

Date:	**3/26/2015**
Permit Type:	**FIRE**
Description:	**NEW VENTURE CHURCH**
Permit Description:	**FIRE**
Work Class:	FIRE SPRINKLER COMM
Proposed Use:	
Permit Number:	FIRE15-0035
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

Date:	**4/17/2012**
Permit Type:	**BLDG**
Description:	**NEW VENTURE CHRISTIAN FELLOWSHIP - TI**
Permit Description:	**BUILDING**
Work Class:	BLD TI GENERAL
Proposed Use:	STRUCTURAL 400
Permit Number:	BLDG12-0409
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	CLASSIC CARPETS INC.

Date:	**10/21/2011**
Permit Type:	**ROWP**
Description:	**Special Event - Autumn Fest 2011**
Permit Description:	**RIGHT OF WAY PERMIT**
Work Class:	ROW PERMIT
Proposed Use:	MISCELLANEOUS
Permit Number:	ROWP11-0324
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

TARGET PROPERTY FINDINGS

Date:	**6/21/2011**
Permit Type:	**BLDG**
Description:	**426EXTERIOR STAIR REPLACEMENT**
Permit Description:	**BUILDING**
Work Class:	BLD DECK
Proposed Use:	
Permit Number:	BLDG11-0882
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	TOHZAY RAMIREZ

Date:	**5/1/2008**
Permit Type:	
Description:	**NEW RESOURCE CNTER 2 STORY**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	173142
Status:	
Valuation:	$1,000,000.00
Contractor Company:	
Contractor Name:	MARCOTT & HEARNE BLDRS

Date:	**5/1/2008**
Permit Type:	
Description:	**NEW VENTURE CHRISTIAN FELLOWSHIP REMODEL EXISTING CLASSROOM BUILDING CONVERT CLASSROOM TO KITCHEN , STORGE AND FELLOWSHIP SERVICES AREA**
Permit Description:	
Work Class:	
Proposed Use:	Non-Residential Addition
Permit Number:	173141
Status:	
Valuation:	$1,000,000.00
Contractor Company:	
Contractor Name:	OWNER / BUILDER

Date: **5/1/2008**
Permit Type:
Description: **NEW RESOURCE CNTER BLDG, TI TO EXITSTING CLASSROOM BLDG AND TI TO EXISTING SANCTUARY ADMIN OFFICE**

Permit Description:
Work Class:
Proposed Use: Non-Residential Addition
Permit Number: 173143
Status:
Valuation: $1,000,000.00
Contractor Company:
Contractor Name: MARCOTT & HEARNE BLDRS

Date: **12/20/2004**
Permit Type:
Description: **TI NEW VENTURE CHRISTIAN FELLOWSHIP**

Permit Description:
Work Class:
Proposed Use: Non-Residential Addition
Permit Number: 163403
Status:
Valuation: $13,980.00
Contractor Company:
Contractor Name: PIPES PLUMBING

Date: **2/11/2002**
Permit Type:
Description: **TI - NEW VENTURE CHRISTIAN**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 140682
Status:
Valuation: $800.00
Contractor Company:
Contractor Name: AMERICAN RES SER

TARGET PROPERTY FINDINGS

Date:	**6/13/2001**
Permit Type:	
Description:	**DEMO & ADD OFFICE TI**
Permit Description:	
Work Class:	
Proposed Use:	Non-Residential Addition, New Single Family Residence
Permit Number:	137327
Status:	
Valuation:	$3,300.00
Contractor Company:	
Contractor Name:	DIVERSIFIED CONSTRUCTION INC

ADJOINING PROPERTY FINDINGS

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

CORDOBA WAY

4665 CORDOBA WAY

Date:	**2/28/2012**
Permit Type:	**BLDG**
Description:	**CONSTRUCT 101 SF ALUM PATIO COVER**
Permit Description:	**BUILDING**
Work Class:	BLD PATIO COVER
Proposed Use:	CUSTOM
Permit Number:	BLDG12-0271
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	AMERICAN PATIO & AWNING

Date:	**10/22/2009**
Permit Type:	**ROOFING**
Description:	**(10/22/2009 3:26 PM TMA) RECOVER OVER EXIST'G TORCHDOWN ROOFING, INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST UL #R10128 6 1/2 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00162
Status:	ISSUED
Valuation:	$3,250.00
Contractor Company:	
Contractor Name:	OLIGER ALICIA M LIVING TRUST 0

Date: **6/28/2004**
Permit Type:
Description: **HOT & COLD WATER REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 152965
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: HANNA PLUMBING

4667 CORDOBA WAY

Date: **9/28/2015**
Permit Type: **BLDG**
Description: **377 SQ FT PATIO COVER**

Permit Description: **BUILDING**
Work Class: BLD PATIO COVER
Proposed Use: CUSTOM 251-499
Permit Number: BLDG15-2651
Status: RECEIVED
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **5/16/2012**
Permit Type: **BLDG**
Description: **COPPER REPIPE (9 FIXTURES)**

Permit Description: **BUILDING**
Work Class: BLD RESIDENTIAL PME
Proposed Use: SIMPLE
Permit Number: BLDG12-0726
Status: ISSUED
Valuation: $0.00
Contractor Company:
Contractor Name: A-BOMB PLUMBING CO

Date:	**10/22/2009**
Permit Type:	**ROOFING**
Description:	**(10/22/2009 3:19 PM TMA) RECOVER OVER EXIST'G TORCHDOWN ROOFING, INSTALL POLYETHYLENE SLIP SHEET, INSTALL PVC 60 MIL DUROLAST UL #R10128 3 1/2 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00160
Status:	ISSUED
Valuation:	$1,750.00
Contractor Company:	
Contractor Name:	MCCARTHY FAMILY TRUST 05-17-94

4668 CORDOBA WAY

Date:	**7/23/2012**
Permit Type:	**BLDG**
Description:	**HOT & COLD REPIPE - 12 FIXTURES**
Permit Description:	**BUILDING**
Work Class:	BLD RESIDENTIAL PME
Proposed Use:	SIMPLE
Permit Number:	BLDG12-1095
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	A-BOMB PLUMBING CO

Date:	**9/13/2007**
Permit Type:	
Description:	**REROOF: T/O EXISTING BUR & INSTALL BUR DIBITEN UL#R11659 PITCH 1/4:12 7 SQ**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171145
Status:	
Valuation:	$3,500.00
Contractor Company:	
Contractor Name:	BOB PIVA ROOFING

4669 CORDOBA WAY

Date:	**9/13/2007**
Permit Type:	
Description:	**REROOF: T/O EXISTING BUR & INSTALL BUR DIBITEN UL#R11659 PITCH 1/4:12 7 SQ**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171142
Status:	
Valuation:	$3,500.00
Contractor Company:	
Contractor Name:	BOB PIVA ROOFING

Date: **9/12/2002**
Permit Type:
Description: **HOT & COLD REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 143975
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: AMERICAN PATIO

4670 CORDOBA WAY

Date: **10/23/2009**
Permit Type: **ROOFING**
Description: **(10/22/2009 2:45 PM TSO) RECOVER OVER 1 LAYER TORCH DOWN W/ NEW POLYETHYLENE SLIP SHEET AND 60 MIL PVC DUROLAST ROOF SYSTEM R10128 1/4:12 PITCH 2.5 SQUARES REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**

Permit Description:
Work Class:
Proposed Use:
Permit Number: BLDG09-00157
Status: ISSUED
Valuation: $1,250.00
Contractor Company:
Contractor Name: LARSEN FAMILY TRUST 07-23-93

ADJOINING PROPERTY FINDINGS

Date:	**6/21/2007**
Permit Type:	
Description:	**HOT & COLD COPPER REPIPE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	165856
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	CA DELTA MECHANICAL

4671 CORDOBA WAY

Date:	**9/13/2007**
Permit Type:	
Description:	**REROOF: T/O EXISTING BUR & INSTALL BUR DIBITEN UL#R11659 PITCH 1/4:12 7 SQ**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171143
Status:	
Valuation:	$3,500.00
Contractor Company:	
Contractor Name:	BOB PIVA ROOFING

4672 CORDOBA WAY

Date:	**3/17/2011**
Permit Type:	**BLDG**
Description:	**REPLACE EXISTING FAU & A/C UNIT LIKE FOR LIKE**
Permit Description:	**BUILDING**
Work Class:	MECH GENERAL
Proposed Use:	
Permit Number:	BLDG11-0448
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	ARS OF SAN DIEGO

Date:	**10/23/2009**
Permit Type:	**ROOFING**
Description:	**(10/23/2009 9:42 AM TMA) RECOVER OVER EXIST'G TORCHDOWN ROOFING, INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST UL #R10128 2 1/2 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00181
Status:	ISSUED
Valuation:	$1,250.00
Contractor Company:	
Contractor Name:	CHARLES DARLENE S TRUST 02-19-

ADJOINING PROPERTY FINDINGS

4673 CORDOBA WAY

Date:	**9/27/2012**
Permit Type:	**BLDG**
Description:	**REPLACE EXISTING CONDENSER, 3 TON , 13 SEER LIKE FOR LIKE**
Permit Description:	**BUILDING**
Work Class:	BLD RESIDENTIAL PME
Proposed Use:	SIMPLE
Permit Number:	BLDG12-1574
Status:	APPROVED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	OAK ISLAND HEATING & AC

Date:	**10/22/2009**
Permit Type:	**ROOFING**
Description:	**(10/22/2009 3:49 PM TMA) RECOVER OVER EXIST'G TORCHDOWN ROOFING. INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST UL #R10128 5 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00165
Status:	ISSUED
Valuation:	$2,500.00
Contractor Company:	
Contractor Name:	FISCHER BERTE S TR

ADJOINING PROPERTY FINDINGS

4674 CORDOBA WAY

Date:	**10/22/2009**
Permit Type:	**ROOFING**
Description:	**(10/22/2009 4:03 PM TMA) RECOVER OVER EXIST'G TORCHDOWN ROOFING. INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST UL #R10128 3 1/2 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00168
Status:	ISSUED
Valuation:	$1,750.00
Contractor Company:	
Contractor Name:	MCCREA FAMILY TRUST 04-12-90

Date:	**2/23/2006**
Permit Type:	
Description:	**PLUMBING: COPPER PIPING REPIPE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	163859
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	OWNER/BLDG

ADJOINING PROPERTY FINDINGS

Date: **8/7/2002**
Permit Type:
Description: **OPEN LATTICE PATIO COVER**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 143349
Status:
Valuation: $3,000.00
Contractor Company:
Contractor Name: BUCKMAN ENT.

4675 CORDOBA WAY

Date: **9/17/2015**
Permit Type: **BLDG**
Description: **REPLACE FAU AND AC UNIT**

Permit Description: **BUILDING**
Work Class: BLD RESIDENTIAL PME
Proposed Use: SIMPLE
Permit Number: BLDG15-2511
Status: ISSUED
Valuation: $0.00
Contractor Company:
Contractor Name: COOL AIR SOLUTIONS

Date: **9/12/2012**
Permit Type: **BLDG**
Description: **OPEN LATTICE 401SF PATIO COVER ICC ESR-1953**

Permit Description: **BUILDING**
Work Class: BLD PATIO COVER
Proposed Use: STANDARD 251-499
Permit Number: BLDG12-1448
Status: ISSUED
Valuation: $0.00
Contractor Company:
Contractor Name: AMERICAN PATIO & AWNING

ADJOINING PROPERTY FINDINGS

Date: **10/22/2009**
Permit Type: **ROOFING**
Description: **(10/22/2009 3:40 PM TMA) RECOVER OVER EXIST'G TORCHDOWN ROOFING, INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST UL #R10128 5 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**

Permit Description:
Work Class:
Proposed Use:
Permit Number: BLDG09-00163
Status: ISSUED
Valuation: $2,500.00
Contractor Company:
Contractor Name: OHARA FAMILY TRUST 06-04-82

Date: **2/3/2004**
Permit Type:
Description: **HOT & COLD COPPER TYPE REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 151647
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: BERCKS FAMILY

4676 CORDOBA WAY

Date:	**10/22/2009**
Permit Type:	**ROOFING**
Description:	**(10/22/2009 3:55 PM TMA) RECOVER OVER EXIST'G TORCHDOWN ROOFING. INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST UL #R10128 6 1/2 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00166
Status:	ISSUED
Valuation:	$3,250.00
Contractor Company:	
Contractor Name:	REDFEARN PRISCILLA G

Date:	**12/20/2006**
Permit Type:	
Description:	**REPLACE WATER HEATER**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	166525
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	BETHEL CONSTRUCTION

Date:	**12/7/2006**
Permit Type:	
Description:	**REPLACE WATER HEATER**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	166513
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	RAPID PLUMBING

4677 CORDOBA WAY

Date:	**10/22/2009**
Permit Type:	**ROOFING**
Description:	**(10/22/2009 4:08 PM TMA) RECOVER OVER EXIST'G FOAM ROOFING. INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST UL #R10128 6 1/2 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00169
Status:	ISSUED
Valuation:	$3,250.00
Contractor Company:	
Contractor Name:	SIVIY JUDY TRUST 04-22-99

ADJOINING PROPERTY FINDINGS

Date:	**3/20/2008**
Permit Type:	
Description:	**REPLACE WATER HEATER**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	172595
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	HANNA PLUMBING

Date:	**1/13/2004**
Permit Type:	
Description:	**HOT & COLD COPPER REPIPE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	151640
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	BERCKS FAMILY

ADJOINING PROPERTY FINDINGS

4678 CORDOBA WAY

Date:	**10/23/2009**
Permit Type:	**ROOFING**
Description:	**(10/23/2009 8:30 AM TMA) RECOVER OVER EXIST'G FOAM ROOFING, INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST UL #R10128 2 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00174
Status:	FINALED
Valuation:	$1,000.00
Contractor Company:	
Contractor Name:	TAYLOR VIOLA B LIVING TRUST 04

4679 CORDOBA WAY

Date:	**10/23/2009**
Permit Type:	**ROOFING**
Description:	**(10/23/2009 8:07 AM TMA) RECOVER OVER EXIST'G FOAM ROOFING, INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST UL #R10128 6 1/2 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00173
Status:	ISSUED
Valuation:	$3,250.00
Contractor Company:	
Contractor Name:	PURNELL ANNE REVOCABLE TRUST 1

ADJOINING PROPERTY FINDINGS

Date: **8/21/2006**
Permit Type:
Description: **CONVERT ATTIC TO LOFT**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 163353
Status:
Valuation: $20,497.00
Contractor Company:
Contractor Name: BOB PIVA ROOFING

Date: **2/25/2003**
Permit Type:
Description: **COPPER REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 147877
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: BERCK'S PLUMBING

Date: **2/3/2003**
Permit Type:
Description: **REPLACE WATER HEATER AND COPPER REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 147231
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: BERCK'S FAMILY PLUMBING

4680 CORDOBA WAY

Date:	**11/16/2009**
Permit Type:	**PLB REPIPE DWV**
Description:	
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00316
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	WOLFE EVE J TRUST 08-22-90

Date:	**10/23/2009**
Permit Type:	**ROOFING**
Description:	**(10/23/2009 8:55 AM TMA) RECOVER OVER EXIST'G FOAM ROOFING, INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST UL #R10128 4 SQUARES (FLAT ROOF) REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00176
Status:	ISSUED
Valuation:	$2,000.00
Contractor Company:	
Contractor Name:	WOLFE EVE J TRUST 08-22-90

ADJOINING PROPERTY FINDINGS

4681 CORDOBA WAY

Date:	**9/13/2007**
Permit Type:	
Description:	**REROOF: T/O EXISTING BUR & INSTALL BUR DIBITEN UL#R11659 PITCH 1/4:12 7 SQ**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171140
Status:	
Valuation:	$3,500.00
Contractor Company:	
Contractor Name:	BOB PIVA ROOFING

Date:	**10/22/2003**
Permit Type:	
Description:	**COPPER REPIPE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	150219
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	BERCK'S FAMILY PLUMBING

4682 CORDOBA WAY

Date:	**4/6/2016**
Permit Type:	**BLDG**
Description:	**RE-ROOF 14 SQUARES WITH ESR 3523; 4:12 PITCH**
Permit Description:	**BUILDING**
Work Class:	BLD ROOFING
Proposed Use:	
Permit Number:	BLDG16-1119
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DILS ROOFING

Date:	**9/6/2007**
Permit Type:	
Description:	**REROOF: T/O EXISTING BUR GRAVEL ROOF, INSTALL ONE-LAYER GLASS BASE SHEET, DIBITEN POLY 4.5 #R11659 7 SQ LOW PITCH**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171136
Status:	
Valuation:	$3,500.00
Contractor Company:	
Contractor Name:	BOB PIVA ROOFING

4683 CORDOBA WAY

Date:	**9/13/2007**
Permit Type:	
Description:	**REROOF: T/O EXISTING BUR & INSTALL BUR DIBITEN UL#R11659 PITCH 1/4:12 7 SQ**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171141
Status:	
Valuation:	$3,500.00
Contractor Company:	
Contractor Name:	OWNER/BUILDER

Date:	**10/22/2003**
Permit Type:	
Description:	**COPPER REPIPE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	147890
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	A & J FOSTER INC

4684 CORDOBA WAY

Date:	**9/6/2007**
Permit Type:	
Description:	**REROOF: T/O EXISTING BUR GRAVEL ROOF, INSTALL ONE-LAYER GLASS BASE SHEET, DIBITEN POLY 4.5 UL#R11659 7 SQ LOW PITCH ROOF**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171133
Status:	
Valuation:	$3,500.00
Contractor Company:	
Contractor Name:	BOB PIVA ROOFING

Date:	**8/22/2007**
Permit Type:	
Description:	**HOT & COLD COPPER REPIPE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	170992
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	OWNER/BUILDER

ADJOINING PROPERTY FINDINGS

4685 CORDOBA WAY

Date:	**10/23/2009**
Permit Type:	**ROOFING**
Description:	**(10/23/2009 8:45 AM TSO) RECOVER OVER EXISTING TORCH DOWN W/ NEW POLYETHYLELE SLIP SHEET AND 60 MIL PVC DUROLAST ROOF SYSTEM R10128 1/4:12 PITCH REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00175
Status:	FINALED
Valuation:	$1,250.00
Contractor Company:	
Contractor Name:	MILLER BETTY B LIVING TRUST 12

4686 CORDOBA WAY

Date:	**9/6/2007**
Permit Type:	
Description:	**REROOF: T/O EXISTING BUR GRAVEL ROOF, INSTALL ONE LAYER GLASS BASE SHEET, DIBITEN POLY 4.5 UL#R11659 6 SQ LOW PITCH ROOF**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171132
Status:	
Valuation:	$2,800.00
Contractor Company:	
Contractor Name:	BOB PIVA ROOFING

ADJOINING PROPERTY FINDINGS

4687 CORDOBA WAY

Date:	**3/26/2012**
Permit Type:	**BLDG**
Description:	**ATTACHED LATTICE PATIO COVER 90 SF ICC ESR 1953**
Permit Description:	**BUILDING**
Work Class:	BLD PATIO COVER
Proposed Use:	STANDARD
Permit Number:	BLDG12-0428
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	AMERICAN PATIO & AWNING

Date:	**10/23/2009**
Permit Type:	**ROOFING**
Description:	**(10/23/2009 8:57 AM TSO) RECOVER OVER EXISTING TORCH DOWN W/ NEW POLYETHYLENE SLIP SHEET AND 60 MIL PVC DUROLAST ROOF SYSTEM 1/4:12 PITCH REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00177
Status:	ISSUED
Valuation:	$1,250.00
Contractor Company:	
Contractor Name:	HUBER FAMILY TRUST 11-29-99

Date:	**12/2/2003**
Permit Type:	
Description:	**HOT & COLD COPPER TYPE L REPIPE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	151628
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	DELTA MECHANICAL, INC.

4689 CORDOBA WAY

Date:	**9/6/2007**
Permit Type:	
Description:	**REROOF: T/O EXISTING BUR GRAVEL ROOF, INSTALL ONE-LAYER GLASS BASE SHEET, ONE LAYER DIBITEN POLY 4.5 UL#R11659**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171134
Status:	
Valuation:	$3,500.00
Contractor Company:	
Contractor Name:	BOB PIVA ROOFING

Date: **8/18/2003**
Permit Type:
Description: **HOT & COLD COPPER REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 150180
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: BERCK'S FAMILY PLUMBING

4690 CORDOBA WAY

Date: **9/6/2007**
Permit Type:
Description: **REROOF: T/O EXISTING BUR GRAVEL ROOF, INSTALL ONE LAYER GLASS BASE SHEET, DIBITEN POLY 4.5 UL#R11659 6 SQ LOW PITCH ROOF**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 171135
Status:
Valuation: $2,800.00
Contractor Company:
Contractor Name: BOB PIVA ROOFING

Date: **7/31/2003**
Permit Type:
Description: **HOT & COLD REPIPE & WATER HEATER**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 150110
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: BERCK'S FAMILY PLUMBING

4691 CORDOBA WAY

Date: **2/1/2017**
Permit Type: **BLDG**
Description: **SOLID INSULATED ALUMINUM PATIO COVER W/ELECTRIC**

Permit Description: **BUILDING**
Work Class: BLD PATIO COVER
Proposed Use: CUSTOM 251-499
Permit Number: BLDG17-0211
Status: ISSUED
Valuation: $0.00
Contractor Company:
Contractor Name: SKYLINE SUNROOMS, INC

Date: **10/25/2016**
Permit Type: **BLDG**
Description: **ROOF MOUNT SOLAR/3.79KW/11MODS/11INVERT/NO UPGRD**

Permit Description: **BUILDING**
Work Class: BLD SOLAR PV RES
Proposed Use:
Permit Number: BLDG16-3083
Status: ISSUED
Valuation: $0.00
Contractor Company:
Contractor Name: SEMPER SOLARIS CONSTRUCTION

Date: **9/6/2007**
Permit Type:
Description: **REROOF: T/O EXISTING BUR GRAVEL, INSTALL ONE-LAYER GLASS BASE SHEET, ONE LAYER DIBITEN POLY 4.5 UL#R11659 7 SQ LOW PITCH ROOF**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 171131
Status:
Valuation: $3,500.00
Contractor Company:
Contractor Name: BERCKS FAMILY PLUMBING

Date: **2/7/2002**
Permit Type:
Description: **ELECT & PLUMB AT KITCHEN**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 140645
Status:
Valuation: $2,000.00
Contractor Company:
Contractor Name: MIRABELLA CONST

ADJOINING PROPERTY FINDINGS

4693 CORDOBA WAY

Date: **7/25/2013**
Permit Type: **BLDG**
Description: **REROOF ABOVE ENTRY WITH (E) TILE W/2-LAYERS 40# FELT**

Permit Description: **BUILDING**
Work Class: BLD ROOFING
Proposed Use:
Permit Number: BLDG13-1456
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: DILS ROOFING

Date: **3/1/2013**
Permit Type: **BLDG**
Description: **REPIPE PEX IN WHOLE HOUSE 12 FIXTURES**

Permit Description: **BUILDING**
Work Class: BLD RESIDENTIAL PME
Proposed Use: SIMPLE
Permit Number: BLDG13-0382
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name:

Date: **7/3/2010**
Permit Type: **WEB**
Description: **Replace 40 gallon gas water heater - Same location = garage**

Permit Description: **WEB**
Work Class: SFD WATER HEATER REP
Proposed Use:
Permit Number: WEB10-00090
Status: EXPIRED
Valuation: $0.00
Contractor Company:
Contractor Name: ALAN HERTLE

Date:	**10/21/2009**
Permit Type:	**ROOFING**
Description:	**(10/21/2009 3:40 PM TMA) RECOVER OVER EXISTING FOAM ROOF, INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST ULR#10128 12 SQUARES REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**
Permit Description:	
Work Class:	
Proposed Use:	
Permit Number:	BLDG09-00145
Status:	ISSUED
Valuation:	$1,400.00
Contractor Company:	
Contractor Name:	HERTLE ALLAN A TRUST 02-09-88

4694 CORDOBA WAY

Date:	**5/20/2014**
Permit Type:	**BLDG**
Description:	**ADD 2 TON, 14 SEER YORK A/C UNIT TO SIDE OF SFD**
Permit Description:	**BUILDING**
Work Class:	BLD RESIDENTIAL PME
Proposed Use:	SIMPLE
Permit Number:	BLDG14-0886
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MACLEOD HEATING & AIR

Date: **10/21/2009**
Permit Type: **ROOFING**
Description: **(10/21/2009 3:25 PM TMA) RECOVER OVER EXIST'G ROOF, INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST ULR #10128 10 SQUARES REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**

Permit Description:
Work Class:
Proposed Use:
Permit Number: BLDG09-00143
Status: FINALED
Valuation: $2,250.00
Contractor Company:
Contractor Name: NANI BARBARA TRUST 05-02-05

4695 CORDOBA WAY

Date: **10/21/2009**
Permit Type: **ROOFING**
Description: **(10/21/2009 3:43 PM TMA) RECOVER OVER EXIST'G FOAM ROOF, INSTALL POLYETHYLENE SLIP SHEET. INSTALL PVC 60 MIL DUROLAST ULR#10128 12 SQUARES REROOF RECOVER, REROOF RECOVER, REROOF RECOVER**

Permit Description:
Work Class:
Proposed Use:
Permit Number: BLDG09-00146
Status: FINALED
Valuation: $1,400.00
Contractor Company:
Contractor Name: LIEDERMAN FAMILY TRUST 12-27-8

Date: **4/17/2003**
Permit Type:
Description: **COPPER REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 148478
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: BERCK'S FAMILY PLUMBING

CYRUS WAY

4601 CYRUS WAY

Date: **4/25/2013**
Permit Type: **WEB**
Description: **Replace water heater, same size, same location.**

Permit Description: **WEB**
Work Class: SFD WATER HEATER REP
Proposed Use:
Permit Number: WEB13-0157
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: AFFORDABLE WATER HEATERS &

4618 CYRUS WAY

Date:	**1/22/2001**
Permit Type:	
Description:	**WATER HEATER REPLACEMENT**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	134663
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	TORREY PINES PLUMBING

4624 CYRUS WAY

Date:	**9/15/2004**
Permit Type:	
Description:	**REPLACE WATER HEATER**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	156329
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	A & J FOSTER INC

4647 CYRUS WAY

Date:	**7/6/2010**
Permit Type:	**BLDG**
Description:	**NEW RESIDENTIAL ELEVATOR**
Permit Description:	**BUILDING**
Work Class:	RESIDENTIAL REMODEL
Proposed Use:	
Permit Number:	BLDG10-01232
Status:	APPROVED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

Date:	**11/4/2009**
Permit Type:	**RESIDENTIAL REMODEL**
Description:	
Permit Description:	
Work Class:	
Proposed Use:	SINGLE FAMILY
Permit Number:	BLDG09-00090
Status:	FINALED
Valuation:	$40,000.00
Contractor Company:	
Contractor Name:	TVO ENTERPRISES INC

4668 CYRUS WAY

Date:	**9/28/2005**
Permit Type:	
Description:	**REPIPE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	161347
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	HANNA PLUMBING

Date:	**10/1/2002**
Permit Type:	
Description:	**COPPER REPIPE, WATER HEATER**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	144521
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	CHANEY ELECTRIC

4676 CYRUS WAY

Date:	**11/6/2013**
Permit Type:	**BLDG**
Description:	**REPLACE (E) FURNACE AND A/C UNITS. LIKE FOR LIKE. SAME LOC**
Permit Description:	**BUILDING**
Work Class:	BLD RESIDENTIAL PME
Proposed Use:	SIMPLE
Permit Number:	BLDG13-2263
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	ACTION A/C HEATING & SOLAR

Date:	**7/14/2010**
Permit Type:	**BLDG**
Description:	
Permit Description:	**BUILDING**
Work Class:	PLB GENERAL
Proposed Use:	
Permit Number:	BLDG10-01283
Status:	EXPIRED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	GOOSENBERG FAMILY TRUST 08-11-

LEISURE VILLAGE WAY

4600 LEISURE VILLAGE WAY

Date:	**11/30/2016**
Permit Type:	**BLDG**
Description:	**REMOVE EXISTING ELECTRIC SUB PANEL ADD 75 KVA TRANSFORMER**
Permit Description:	**BUILDING**
Work Class:	BLD COMMERCIAL PME
Proposed Use:	COMPLEX
Permit Number:	BLDG16-3382
Status:	RECEIVED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	BAKER ELECTRIC INC

Date:	**8/25/2016**
Permit Type:	**BLDG**
Description:	**LEISURE VILLAGE CLUB HOUSE/REMVE EXIST 120/240V I**
Permit Description:	**BLDG**
Work Class:	BLD COMMERCIAL PME
Proposed Use:	COMPLEX
Permit Number:	BLDG16-2530
Status:	RECEIVED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	

ADJOINING PROPERTY FINDINGS

Date: **2/9/2015**
Permit Type: **BLDG**
Description: **REROOF OFFICE BLDG OVER SINGLE LAYER CAP SHEET**

Permit Description: **BUILDING**
Work Class: BLD ROOFING
Proposed Use:
Permit Number: BLDG15-0321
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: DILS ROOFING

Date: **7/18/2012**
Permit Type: **BLDG**
Description: **COPPER REPIPE (5) FIXTURES AT HOA OFFICE**

Permit Description: **BUILDING**
Work Class: BLD RESIDENTIAL PME
Proposed Use: SIMPLE
Permit Number: BLDG12-1071
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: PIPES PLUMBING

Date: **7/14/2008**
Permit Type:
Description: **REROOF RECOVER OVER EXISTING TORCH DOWN W/ NEW DURO LAST 60 MIL TPO SYS UL-R10128 SEPERATION W/ POLYETHYLENE SHEET 1/4:12 80 SQUARES CLUB HOUSE**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 174606
Status:
Valuation: $61,000.00
Contractor Company:
Contractor Name: O/B

Date: **5/15/2007**
Permit Type:
Description: **REMOVE AND REPLACE ELEVEN ROOFTOP FOR PACKAGED GAS-AC UNITS WITH EQUAL SIZES FOR**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 168044
Status:
Valuation: $172,000.00
Contractor Company:
Contractor Name: SKYLINE SUNROOMS

MAJORCA WAY

4655 MAJORCA WAY

Date: **6/24/2010**
Permit Type: **BLDG**
Description: **DUPLEX REROOF REPLACEMENT**

Permit Description: **BUILDING**
Work Class: ROOFING
Proposed Use:
Permit Number: BLDG10-01135
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: RUEHLE GEORGE H&ELIABETH LIVIN

ADJOINING PROPERTY FINDINGS

Date:	**11/14/2007**
Permit Type:	
Description:	**COPPER REPIPE (HOT & COLD) REPLACE EXISTING WATER HEATER (NO CHANGE IN SIZE OR LOCATION) LOCATED IN GARAGE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	171771
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	RM CONSTRUCTION

4659 MAJORCA WAY

Date:	**6/3/2014**
Permit Type:	**BLDG**
Description:	**REPLACE FURNACE AND AIR**
Permit Description:	**BLDG**
Work Class:	BLD RESIDENTIAL PME
Proposed Use:	SIMPLE
Permit Number:	BLDG14-0994
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MAUZY HEATING & AIR

Date: **6/24/2010**
Permit Type: **BLDG**
Description: **DUPLEX REROOF REPLACEMENT**

Permit Description: **BUILDING**
Work Class: ROOFING
Proposed Use:
Permit Number: BLDG10-01137
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: ROTHMAN FAMILY TRUST 10-15-96

4661 MAJORCA WAY

Date: **3/13/2014**
Permit Type: **BLDG**
Description: **REPAIR - FROM EXISTING WATER METER TO EXISTING WATER LINE**

Permit Description: **BUILDING**
Work Class: BLD RESIDENTIAL PME
Proposed Use: SIMPLE
Permit Number: BLDG14-0424
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: 1 800 ANYTYME

Date: **10/11/2004**
Permit Type:
Description: **ROOM ADD: ATRIUM REMODEL WITH TWO SKYLIGHTS**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 156580
Status:
Valuation: $8,800.00
Contractor Company:
Contractor Name: OWNER

ADJOINING PROPERTY FINDINGS

4662 MAJORCA WAY

Date: **6/24/2010**
Permit Type: **BLDG**
Description: **DUPLEX REROOF REPLACEMENT**

Permit Description: **BUILDING**
Work Class: ROOFING
Proposed Use:
Permit Number: BLDG10-01138
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: OWEN BARBARA J

Date: **7/17/2003**
Permit Type:
Description: **HOT & COLD WATER REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 149840
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: CONSOLIDATED CONTRACTING SERVI

Date: **10/11/2000**
Permit Type:
Description: **REPLACE FAU**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 133810
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: MOORCO

4663 MAJORCA WAY

Date:	**12/5/2007**
Permit Type:	
Description:	**REROOF: T/O BUR, INSTALL DIBITEN BUR UL#R11659 PITCH 1/4:12 7 SQ**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171687
Status:	
Valuation:	$3,500.00
Contractor Company:	
Contractor Name:	BOB PIVA ROOFING

Date:	**1/22/2003**
Permit Type:	
Description:	**HOT & COLD WATER REPIPE/INSTALL WATER HEATER**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	146343
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	LEONS CEMENT

4665 MAJORCA WAY

Date: **12/5/2007**
Permit Type:
Description: **REROOF: T/O BUR, INSTALL DIBITEN BUR UL#R11659 PITCH 1/4:12 7 SQ**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 171688
Status:
Valuation: $3,500.00
Contractor Company:
Contractor Name: BOB PIVA ROOFING

Date: **4/17/2007**
Permit Type:
Description: **OPEN LATTICE PATIO COVER ALUMIWOOD (PER ECC ER 2640P) 10X30 REPLACES EXISTING 10X30 PATIO COVER**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 168053
Status:
Valuation: $5,000.00
Contractor Company:
Contractor Name: CA DELTA MECHANICAL

ADJOINING PROPERTY FINDINGS

Date:	**6/13/2006**
Permit Type:	
Description:	**COPPER REPIPE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	163450
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	WOLFPACK SIGN GROUP

4667 MAJORCA WAY

Date:	**1/31/2014**
Permit Type:	**BLDG**
Description:	**Copper Repipe**
Permit Description:	**BUILDING**
Work Class:	BLD RESIDENTIAL PME
Proposed Use:	SIMPLE
Permit Number:	BLDG14-0181
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	A-BOMB PLUMBING CO

Date:	**6/24/2010**
Permit Type:	**BLDG**
Description:	**DUPLEX REROOF REPLACEMENT**
Permit Description:	**BUILDING**
Work Class:	ROOFING
Proposed Use:	
Permit Number:	BLDG10-01139
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	SINGER FAMILY TRUST 05-25-98

Date: **11/15/2002**
Permit Type:
Description: **REROOF**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 145044
Status:
Valuation: $590.00
Contractor Company:
Contractor Name:

4671 MAJORCA WAY

Date: **3/11/2011**
Permit Type: **BLDG**
Description: **FIRE DAMAGE REPAIR**

Permit Description: **BUILDING**
Work Class: RESIDENTIAL REMODEL
Proposed Use: DUPLEX
Permit Number: BLDG11-0258
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: NATIONSTAR MORTGAGE L L C

Date: **6/24/2010**
Permit Type: **BLDG**
Description: **DUPLEX REROOF REPLACEMENT**

Permit Description: **BUILDING**
Work Class: ROOFING
Proposed Use:
Permit Number: BLDG10-01140
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: SPAULDING THEA C

4673 MAJORCA WAY

Date: **3/11/2011**
Permit Type: **BLDG**
Description: **FIRE DAMAGE REPAIR**

Permit Description: **BUILDING**
Work Class: RESIDENTIAL REMODEL
Proposed Use: DUPLEX
Permit Number: BLDG11-0256
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: SMOLEN STEPHEN A REVOCABLE TRU

Date: **1/14/2011**
Permit Type: **BLDG**
Description: **RESET ELECTRIC METER FOR HOUSE NEXT TO**

Permit Description: **BUILDING**
Work Class: ELECT GENERAL
Proposed Use:
Permit Number: BLDG11-0072
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: A C ELECTRIC CORP

Date: **6/5/2009**
Permit Type:
Description: **SPA**

Permit Description:
Work Class:
Proposed Use:
Permit Number: 176821
Status:
Valuation: $20,000.00
Contractor Company:
Contractor Name:

ADJOINING PROPERTY FINDINGS

4675 MAJORCA WAY

Date: **6/24/2010**
Permit Type: **BLDG**
Description: **DUPLEX REROOF REPLACEMENT**

Permit Description: **BUILDING**
Work Class: ROOFING
Proposed Use:
Permit Number: BLDG10-01141
Status: FINALED
Valuation: $0.00
Contractor Company:
Contractor Name: CALIX TRUST 06-16-96

Date: **4/8/2003**
Permit Type:
Description: **HOT & COLD REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 148388
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: NCP INC

Date: **3/26/2003**
Permit Type:
Description: **REPLACE WATERHEATER**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 148325
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: DAVID LESGE

ADJOINING PROPERTY FINDINGS

4677 MAJORCA WAY

Date:	**12/1/2004**
Permit Type:	
Description:	**HOT & COLD COPPER TYPE REPIPE**
Permit Description:	
Work Class:	
Proposed Use:	Plumbing,Electrical,Mechanical
Permit Number:	156022
Status:	
Valuation:	$0.00
Contractor Company:	
Contractor Name:	BERCKS FAMILY

4679 MAJORCA WAY

Date:	**11/1/2007**
Permit Type:	
Description:	**T/O EXISTING BUR- REROOF W/28# GLASS BASE DIBITEN TORCH DOWN APPLIED ROOFING- UL#R11659- 7 SQ 1/4:12 PITCH**
Permit Description:	
Work Class:	
Proposed Use:	Residential Addition
Permit Number:	171546
Status:	
Valuation:	$3,500.00
Contractor Company:	
Contractor Name:	BOB PIVA ROOFING

Date: **1/15/2003**
Permit Type:
Description: **REPIPE (HOT & COLD WATER LINES) & WATER HEATE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 146272
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: NORTH COUNTY PLUMBING

4681 MAJORCA WAY

Date: **11/1/2007**
Permit Type:
Description: **REROOF: T/O EXISTING BUR- INSTALL 28# GLASS BASE DIBITEN TORCH DOWN APPLIED ROOFING- UL#R11659- 7 SQ 1/4:12 PITCH**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 171547
Status:
Valuation: $3,500.00
Contractor Company:
Contractor Name: BOB PIVA ROOFING

4683 MAJORCA WAY

Date:	**12/9/2010**
Permit Type:	**WEB**
Description:	**replacing existing 40 gallon natural gas water heater**
Permit Description:	**WEB**
Work Class:	SFD WATER HEATER REP
Proposed Use:	
Permit Number:	WEB10-00246
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MAGNUSEN FAMILY TRUST 05-22-84

Date:	**6/24/2010**
Permit Type:	**BLDG**
Description:	**DUPLEX REROOF REPLACEMENT**
Permit Description:	**BUILDING**
Work Class:	ROOFING
Proposed Use:	
Permit Number:	BLDG10-01142
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MAGNUSEN FAMILY TRUST 05-22-84

4685 MAJORCA WAY

Date:	**12/7/2010**
Permit Type:	**BLDG**
Description:	**Copper repipe 10 fixtures**
Permit Description:	**BUILDING**
Work Class:	PLB REPIPE DWV
Proposed Use:	
Permit Number:	BLDG10-02176
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	MENELEY WILLARD S&LAURA L SURV

4687 MAJORCA WAY

Date:	**6/24/2010**
Permit Type:	**BLDG**
Description:	**DUPLEX REROOF REPLACEMENT**
Permit Description:	**BUILDING**
Work Class:	ROOFING
Proposed Use:	
Permit Number:	BLDG10-01143
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	SECCOMBE WILLIAM J&RUTH M

Date: **10/23/2009**
Permit Type: **PLB GAS LINE**
Description:

Permit Description:
Work Class:
Proposed Use:
Permit Number: BLDG09-00185
Status: ISSUED
Valuation: $0.00
Contractor Company:
Contractor Name: JOSHUA

4689 MAJORCA WAY

Date: **3/31/2006**
Permit Type:
Description: **ROOM ADDITION: 2ND STORY OFFICE, BATH & STORAGE**

Permit Description:
Work Class:
Proposed Use: Residential Addition
Permit Number: 164262
Status:
Valuation: $24,926.00
Contractor Company:
Contractor Name: DG BEHREN POOL CONSTRUCTION

Date: **3/18/2004**
Permit Type:
Description: **HOT & COLD COPPER TYPE L REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 151675
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: PIPES PLUMBING INC.

ADJOINING PROPERTY FINDINGS

4691 MAJORCA WAY

Date:	**6/24/2010**
Permit Type:	**BLDG**
Description:	**DUPLEX REROOF REPLACEMENT**
Permit Description:	**BUILDING**
Work Class:	ROOFING
Proposed Use:	
Permit Number:	BLDG10-01145
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	PETERS FAMILY MARITAL TRUST A

4695 MAJORCA WAY

Date:	**6/24/2010**
Permit Type:	**BLDG**
Description:	**DUPLEX REROOF REPLACEMENT**
Permit Description:	**BUILDING**
Work Class:	ROOFING
Proposed Use:	
Permit Number:	BLDG10-01147
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	WHEATON SILAS P

Date: **11/15/2005**
Permit Type:
Description: **REPIPE**

Permit Description:
Work Class:
Proposed Use: Plumbing,Electrical,Mechanical
Permit Number: 162512
Status:
Valuation: $0.00
Contractor Company:
Contractor Name: MR. ELECTRICIAN

4697 MAJORCA WAY

Date: **5/23/2013**
Permit Type: **BLDG**
Description: **ALUMINUM PATIO COVER 199 SQ**

Permit Description: **BUILDING**
Work Class: BLD PATIO COVER
Proposed Use: CUSTOM
Permit Number: BLDG13-0982
Status: ISSUED
Valuation: $0.00
Contractor Company:
Contractor Name: AMERICAN PATIO & AWNING

ADJOINING PROPERTY FINDINGS

4701 MAJORCA WAY

Date:	**12/21/2012**
Permit Type:	**BLDG**
Description:	**3 TON 13 R4DA CONDENSER AND COIL REPLACEMTN**
Permit Description:	**BUILDING**
Work Class:	BLD RESIDENTIAL PME
Proposed Use:	
Permit Number:	BLDG12-2101
Status:	ISSUED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	BERCK'S OLD TIME PLMB HTG & AI

Date:	**6/23/2011**
Permit Type:	**BLDG**
Description:	**COPPER REPIPE TO MASTER BATH**
Permit Description:	**BUILDING**
Work Class:	BLD RESIDENTIAL PME
Proposed Use:	SIMPLE
Permit Number:	BLDG11-0986
Status:	FINALED
Valuation:	$0.00
Contractor Company:	
Contractor Name:	HOFFMAN NEIL B

GLOSSARY

General Building Department concepts

- **ICC:** The International Code Council. The governing body for the building/development codes used by all jurisdictions who've adopted the ICC guidelines. MOST of the US has done this. Canada, Mexico, and other countries use ICC codes books and guides as well. There are a few states who have added guidelines to the ICC codes to better fit their needs. For example, California has added seismic retrofit requirements for most commercial structures.
- **Building Department (Permitting Authority, Building Codes, Inspections Department, Building and Inspections):** This is the department in a jurisdiction where an owner or contractor goes to obtain permits and inspections for building, tearing down, remodeling, adding to, re-roofing, moving or otherwise making changes to any structure, Residential or Commercial.
- **Jurisdiction:** This is the geographic area representing the properties over which a Permitting Authority has responsibility.
- **GC:** General Contractor. Usually the primary contractor hired for any Residential or Commercial construction work.
- **Sub:** Subordinate contracting companies or subcontractors. Usually a "trades" contractor working for the GC. These contractors generally have an area of expertise in which they are licensed like Plumbing, Electrical, Heating and Air systems, Gas Systems, Pools etc. (called "trades").
- **Journeymen:** Sub contractors who have their own personal licenses in one or more trades and work for different contracting companies, wherever they are needed or there is work.
- **HVAC (Mechanical, Heating & Air companies):** HVAC = Heating, Ventilation, and Air Conditioning.
- **ELEC (Electrical, TempPole, TPole, TPower, Temporary Power, Panel, AMP Change, Power Release):** Electrical permits can be pulled for many reasons. The most common reason is to increase the AMPs of power in an electrical power panel. This requires a permit in almost every jurisdiction. Other commons reason for Electrical permits is to insert a temporary power pole at a new construction site. Construction requires electricity, and in a new development, power has yet to be run to the lot. The temporary power pole is usually the very first permit pulled for new development. The power is released to the home owner when construction is complete and this sometimes takes the form of a Power Release permit or inspection.
- **"Pull" a permit:** To obtain and pay for a building permit.
- **CBO:** Chief Building Official
- **Planning Department:** The department in the development process where the building /structural plans are reviewed for their completeness and compliance with building codes
- **Zoning Department:** The department in the development process where the site plans are reviewed for their compliance with the regulations associated with the zoning district in which they are situated.
- **Zoning District:** A pre-determined geographic boundary within a jurisdiction where certain types of structures are permitted / prohibited. Examples are Residential structure, Commercial/Retail structures, Industrial/Manufacturing structures etc. Each zoning district has regulations associated with it like the sizes of the lots, the density of the structures on the lots, the number of parking spaces required for certain types of structures on the lots etc.
- **PIN (TMS, GIS ID, Parcel#):** Property Identification Number and Tax Map System number.
- **State Card (Business license):** A license card issued to a contractor to conduct business.
- **Building Inspector (Inspector):** The inspector is a building department employee that inspects building construction for compliance to codes.
- **C.O.:** Certificate of Occupancy. This is the end of the construction process and designates that the owners now have permission to occupy a structure after its building is complete. Sometimes also referred to as a Certificate of Compliance.

GLOSSARY

Permit Content Definitions

- Permit Number: The alphanumerical designation assigned to a permit for tracking within the building department system. Sometimes the permit number gives clues to its role, e.g. a "PL" prefix may designate a plumbing permit.
- Description: A field on the permit form that allows the building department to give a brief description of the work being done. More often than not, this is the most important field for EP's to find clues to the prior use(s) of the property.
- Permit Type: Generally a brief designation of the type of job being done. For example BLDG-RES, BLDG-COM, ELEC, MECH etc.

Sample Building Permit Data

Date: Nov 09, 2000
Permit Type: Bldg -
New Permit Number: 101000000405
Status: Valuation: $1,000,000.00
Contractor Company: OWNER-BUILDER
Contractor Name:

Description: New one store retail (SAV-ON) with drive-thru pharmacy. Certificate of Occupancy.

APN 169-562-01-00
4000 MYSTRA WAY
OCEANSIDE, CA 92056

Inquiry Number: 4958705.3
June 06, 2017

Certified Sanborn® Map Report

EDR®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

06/06/17

Site Name:	Client Name:
APN 169-562-01-00	LGCGEOENV
4000 MYSTRA WAY	27570 Commerce Ctr Dr #128
OCEANSIDE, CA 92056	Temecula, CA 92590-2533
EDR Inquiry # 4958705.3	Contact: Kyle Mchargue

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by LGCGEOENV were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # D0CE-4294-9978

PO # G17-1498-15

Project APN 169-562-01-00

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: D0CE-4294-9978

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✓ Library of Congress
- ✓ University Publications of America
- ✓ EDR Private Collection

The Sanborn Library LLC Since 1866™

Limited Permission To Make Copies

LGCGEOENV (the client) is permitted to make up to FIVE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

APN 169-562-01-00
4000 MYSTRA WAY
OCEANSIDE, CA 92056

Inquiry Number: 4958705.7
June 08, 2017

EDR Environmental Lien and AUL Search

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Environmental Lien and AUL Search

The EDR Environmental Lien and AUL Search Report provides results from a search of available current land title records for environmental cleanup liens and other activity and use limitations, such as engineering controls and institutional controls.

A network of professional, trained researchers, following established procedures, uses client supplied address information to:

- search for parcel information and/or legal description;
- search for ownership information;
- research official land title documents recorded at jurisdictional agencies such as recorders' offices, registries of deeds, county clerks' offices, etc.;
- access a copy of the deed;
- search for environmental encumbering instrument(s) associated with the deed;
- provide a copy of any environmental encumbrance(s) based upon a review of key words in the instrument(s) (title, parties involved, and description); and
- provide a copy of the deed or cite documents reviewed.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EDR Environmental Lien and AUL Search

TARGET PROPERTY INFORMATION

ADDRESS

4000 MYSTRA WAY
APN 169-562-01-00
OCEANSIDE, CA 92056

RESEARCH SOURCE

Source 1:

San Diego Recorder
San Diego, CA

PROPERTY INFORMATION

Deed 1:

Type of Deed:	deed
Title is vested in:	Proptea Senior Living Oceanside LLC
Title received from:	New Venture Christian Fellowship Corp
Deed Dated	2/27/2017
Deed Recorded:	3/3/2017
Book:	NA
Page:	na
Volume:	na
Instrument:	na
Docket:	NA
Land Record Comments:	
Miscellaneous Comments:	
Legal Description:	See Exhibit
Legal Current Owner:	Protea Senior Living Oceanside LLC
Parcel # / Property Identifier:	169-562-01-00
Comments:	See Exhibit

ENVIRONMENTAL LIEN

Environmental Lien: Found ☐ Not Found ☒

OTHER ACTIVITY AND USE LIMITATIONS (AULs)

AULs: Found ☐ Not Found ☒

Deed Exhibit 1

RECORDED MAIL DOCUMENT TO:
r Living Oceanside, LLC
piro
Ridge Drive
CA 92656

Space Above This Line for Recorder's Use Only

-562-01-00

File No.: NCS-7822

GRANT DEED

d Grantor(s) Declare(s): DOCUMENTARY TRANSFER TAX $**3,868.70**; CITY TRANSFER TAX $**0**;
computed on the consideration or full value of property conveyed, OR
computed on the consideration or full value less value of liens and/or encumbrances remaining at time of sale,
unincorporated area; [**x**] City of **Oceanside**, and

JABLE CONSIDERATION, receipt of which is hereby acknowledged, **New Venture Christian), a California not-for-profit corporation**

NTS to **Protea Senior Living Oceanside, LLC, a California limited liability company**

g described property in the City of **Oceanside**, County of **San Diego**, State of **California**:

0 OF LEISURE GLEN, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE ORNIA, ACCORDING TO MAP THEREOF NO. 12495, FILED IN THE OFFICE OF THE TY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 8, 1989.

ruary 27, 2017

ure Christian Fellowship, a California
ofit corporation

e: Pastor Shawn Mitchell
Founder and Senior Pastor

e: Art Barter
Chairman of the Board

blic or other officer completing this certificate
the identity of the individual who signed the
which this certificate is attached, and not the
, accuracy, or validity of that document.

California)SS

San Diego)

rch 2, 2017 before me, Lisa L. Courtemanche, Notary Public, person

vn Joel Mitchell and Arthur Russell Barter

to me on the basis of satisfactory evidence to be the person(s) whose name(s) ~~is~~/are subscribe
d acknowledged to me that ~~he~~/~~she~~/they executed the same in ~~his~~/~~her~~/their authorized capacity(ie
signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acte

PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true ar

hand and official seal.

LISA L. COURTEMANCHE
Commission # 2105481
Notary Public - California

APPENDIX D

Hydrology Reports

HYDROLOGY REPORT

For

OCEANSIDE SENIOR LIVING

NEC CANNON ROAD AND MYSTRA DRIVE

OCEANSIDE, CA

Prepared For:

PROTEA SENIOR LIVING OCEANSIDE, LLC.

18 VENTANA RIDGE DR.

Aliso Viejo, CA 92656

Prepared By:

Waber Consultants
PLANNING CIVIL ENGINEERING SURVEYING
INC

Waber Consultants, Inc.

3711 Long Beach Blvd, Suite 1008

Long Beach, CA 90807

(562) 426-8283

October 2017

Table of Contents

Tables

Appendices

1.0 Scope

Hydrologic calculations to evaluate surface runoff associated with 2-, 10-, 50-, and 100-year hypothetical design storm frequencies from the tributary drainage areas were performed. Hydrologic parameters used in the analysis, such as rainfall and soil classification are presented in the *San Diego County Hydrology Manual, June 2003* (Hydrology Manual).

Hydraulics calculations to evaluate pipe sizes to handle the 100-year storm event were performed using the Manning's equation.

Hydraulics calculations based on Hazen-Williams Equation was used in the sizing of dual sump pump system based on the 10-year storm event flow.

Detention basin including its riser sizing calculations were performed based on hydromodification calculations to mitigate the 2-year to 10-year storm flows and volumes using the San Diego Hydrology Model (SDHM) 3.0 Model software.

Biofiltration basins have been sized to treat the Design Capture Volume (DCV) for the site per the current Storm Water Quality Mitigation Plan, Regional Water Quality Control Board, and MS4 Permit requirements.

2.0 Project Description

2.1. Existing Conditions

The subject property is located at NEC Cannon Road and Mystra Drive in Oceanside, California. The site consists of a relatively level 6.46-acre property that is currently a vacant lot. The property is bounded by Cannon Road to the south, Mystra Drive to the west, and a residential subdivision to the north and east. The lot will be subdivided into 2 separate parcels, Parcel 1 and Parcel 2. Parcel 1 is the southern portion of the lot and is 2.93 acres in size. Parcel 2 is the northern portion of the lot 3.53 acres in size.

The existing project site has been rough graded and is relatively flat. It slopes in a generally south westerly direction into two existing drain inlets, located at the southwestern part of the site, that tie-in to existing 24” pipe. The pipe ties-in to existing curb catch basin in Mystra Drive. The subject property is bound by property walls to the north and east and, therefore, does not have upstream off-site run on.

2.2. Proposed Conditions

The proposed project is located within Parcel 1 and it consists of construction of a new 81,764 SF 2-story assisted living facility building, a new drive aisle, parking stalls, landscape areas including biofiltration basins, and an above ground detention basin.

The proposed project is considered a Priority Development Project and permanent BMPs are required for treatment of storm water runoff. A separate Storm Water Quality Management Plan (SWQMP) has been prepared addressing the treatment of storm water runoff requirements including biofiltration and hydromodification.

All roof runoff is conveyed into the proposed onsite storm drain system. Surface drainage in the landscape and hardscape areas eventually drain into the proposed storm drain system. The storm drain system is routed to eventually drain onto the proposed biofiltration basins. The southern portion of the site drains onto Biofiltration Basin #1 and the northern portion of the site drains onto Biofiltration Basin #2. Overflow drains in the biofiltration basins are routed to a sump pump that pumps the flow onto a detention basin located in the courtyard at the west side of the property. Overflow from the detention basin will drain into existing curb inlet catch in Mystra Drive to drain into the existing municipal storm drain system.

The proposed sump pump system includes a 10’ diameter, 13’ deep pump well and an overflow pipe to handle flow greater than the pump capacity (100-yr storm event). The pump well is also equipped with an overflow weir to mitigate the 2-yr to 10-yr flows.

The proposed project is bound by existing property walls to the north and east it does not have upstream off-site run on.

3.0 Hydrology

3.1 Methodology

The hydrologic calculations to determine the 2-, 10-, 50-, and 100-year peak flow rates were performed using the criteria in the *San Diego County Hydrology Manual*. The Rational Method is an empirical computation procedure for developing a peak runoff rate (discharge) for storms of a specific recurrence interval. Rational Method equations are based on the assumption that the peak flow rate is directly proportional to the drainage area, rainfall intensity, and a loss rate coefficient, which describes the effects of land use and soil type. The Rational Method flow rates were computed by generating a hydrologic "link-node" model, which divides the area into drainage subareas. Please see Appendix A for hydrology calculations.

3.2 Areas

Hydrology Maps are included in this report delineating the drainage subareas. Areas are provided in the maps in both square feet (SF) and acres (AC). AC units are used in the rational method calculations.

3.3 Soil

Per soil report prepared by GeoMat Testing Laboratories, Inc. and dated June 16, 2016, the site is underlain by soil classified as dark brown sandy clay and reddish brown clayey sand (USCS “CL” and “SC”). This soil is underlain by shallow bedrock with varying depths across the site at approximately 2’ to 15’ depth below existing ground surface. Therefore, Soil Type B was selected for the hydrology analysis. The project site is located 33^{o}09’55” N, 117^{o}16’08” W per U.S. State Plane Coordinates. Hydrologic Soil Map found in Appendix A of the Hydrology Manual is included in Appendix C of this report for reference. Project is located within Soil B area indicated in the map.

3.4 Runoff Coefficient

The runoff coefficients are based on land use and soil type. The appropriate runoff coefficient (C) was determined by applying the equation provided in Page 3-5 and C_p values presented in Table 3-1 of the Hydrology Manual. Table 3-1 is included in Appendix C of this report for reference.

3.5 Precipitation

The 6-hr and 24-hr precipitation for the 2-, 10-, 50-, and 100-yr storm events was obtained from the Isopluvial Maps located in Appendix B of the Hydrology Manual. The hydrology manual requires the 6-hr precipitation to be within the range of 45% to 65% of the 24 - hr precipitation. The calculated 6-hr precipitation both the 50- and 100-year storm events fall within the required range and is summarized in Table 1 below. Therefore, no adjustments are required.

Table 1 - Precipitation Values

Storm Event	P_6, 6-hr Precipitation (in.)	P_{24}, 24-hr Precipitation (in.)	P_6/P_{24} (%)
2-yr	1.4	2.2	63.6
10-yr	2.0	3.5	57.1
50-yr	2.5	4.5	55.6
100-yr	3.0	5.0	60.0

3.6 Time of Concentration

The Time of Concentration (T_c) is the time required for runoff to flow from the most remote part of the drainage area to the point of interest. The T_c (minutes) is based on slope and runoff coefficient and it was obtained using the equation provided in Figure 3-3 of the Hydrology Manual, and it is included in Appendix C of this report for reference.

3.7 Rainfall Intensity

The rainfall intensity is the rainfall in inches per hour (in/hr) for a duration equal to the T_c for a selected storm frequency. Intensity is dependent on 6-hour precipitation and T_c. It was obtained using the equation provided in Page 3-7 of the Hydrology Manual.

3.8 Hydrology

The peak rate runoff flow of the proposed site increases due to increase in impervious areas including roof, drive aisles, and parking spaces. However, runoff is mitigated by implementation of hydromodification using above ground detention basin as a permanent BMP. The existing and proposed flows were calculated using the Rational Method based on the site conditions discussed in Sections 2.1 and 2.2, respectively.

3.8.1 Existing Hydrology

The entire existing site sheet flows in a generally southwesterly direction towards the existing catch basin located at the southwest side of the property. The catch basin ties into the existing 24” RCP pipe that ties into the existing curb inlet catch basin located in Mystra Drive. The existing flow for the different storm frequencies is outlined in Table 2 below.

Table 2 – Summary of Existing Flow

Storm Event	Q (cfs)
2-yr	2.51
10-yr	3.58
50-yr	4.47
100-yr	5.37

3.8.2 Proposed Hydrology

The proposed project site has been subdivided into subareas for runoff of storm water based on drainage patterns including ridge lines and low/confluence points. The drainage patterns include the roof surface runoff and ground surface runoff areas. Each subarea and the discharge point of each subarea is identified in the Proposed Hydrology Map. Flow for each subarea prior to hydromodification is outlined in Table 3 below:

Table 3 – Summary of Proposed Flows Prior to Hydromodification

Subarea	Q (cfs)				Area	
	2-year	10-year	50-year	100-year	(sf)	(ac)
A1	0.83	1.18	1.48	1.77	16,405	0.38
A2	0.80	1.15	1.43	1.72	3,256	0.07
A3	0.77	1.10	1.37	1.64	3,035	0.07
B1	0.71	1.01	1.27	1.52	8,254	0.19
B2	0.13	0.19	0.23	0.28	976	0.02
B3	1.12	1.60	2.00	2.40	3,978	0.09
B4	0.75	1.07	1.34	1.61	3,567	0.08
C1	0.41	0.58	0.72	0.87	1,858	0.04
C2	1.78	2.55	3.18	3.82	13,632	0.31
D	0.45	0.65	0.81	0.97	3,708	0.09
E	0.04	0.06	0.08	0.09	667	0.02
F1	1.02	1.46	1.82	2.19	10,416	0.24
F2	0.59	0.84	1.05	1.26	3,486	0.08
F3	2.82	4.03	5.03	6.04	11,375	0.26
G	0.99	1.42	1.77	2.13	8,418	0.19
H1	1.74	2.49	3.11	3.73	6,829	0.16
H2	1.32	1.89	2.36	2.83	5,411	0.12
H3	0.19	0.28	0.35	0.42	11,921	0.27
I	5.58	7.98	9.97	11.97	23,081	0.53
L	0.27	0.38	0.48	0.57	8,837	0.20
J	0.04	0.05	0.06	0.08	543	0.01
K	1.03	1.48	1.85	2.22	127,003	2.92
Total	**23.39**	**33.42**	**41.78**	**50.13**	**276,656**	**6.35**

However, hydromodification is applied by use of the detention basin with overflow riser and weirs in order to mitigate the increase in flow. Therefore, post-development Q $\leq$ pre-development Q. Hydromodification analysis was performed as part of the Storm Water Quality Mitigation Plan and is included in Appendix E.

The southern portion of the proposed site drains onto Biofiltration Basin #1. The northern portion of the proposed site drains onto Biofiltration Basin #2. Table 4 below summarizes tributary areas onto the basins.

Table 4 - Tributary Areas into Biofiltration Basins

Biofiltration Basin #	Area
1	F
	G
	H
	I
2	A
	B
	C
	D

4.0 Hydraulics

Hydraulics analysis was performed using Manning's equation for each subarea contributing flow to the proposed underground storm drain system. The proposed storm drain system has been designed to handle capacity for 100-year peak flow rates. Please see Appendix B for hydraulics calculations for the proposed storm drain system.

The sump pump system was designed to handle the proposed 10-year runoff for the entire site. The sump pump was designed to pump flow rates of up to the 10-year runoff onto the detention basin. The pump well includes an overflow pipe sized to handle the 100-year storm runoff. This ensures the detention basin will not receive more than 10-year flow at a rainfall event.

The detention basin was designed by performing continuous simulation hydrologic modeling or an approved regression equation using San Diego Hydrology Model (SDHM) 3.1 software. The modeling was performed as part of the SWQMP report submittal. Simulation was performed for flow rates ranging from 10 percent of the predevelopment 2-year runoff event (0.1Q2) to the pre-development 10-year runoff event (Q10). This translates to flow rates of 0.251 CFS to 3.58 CFS. The basin was sized so the post-project discharge rates and durations do not exceed the pre-development rates and durations by more than 10 percent. See Appendix E for the modeling results.

The detention basin was designed to include a secondary overflow spillway. The spillway has been designed to handle the 10-year storm event of the entire site (Q=23.78 CFS). See Appendix B for detailed calculations. Utilizing hydromodification the controlled flow from the detention basin is 0.19 CFS. See Appendix E for detailed calculations.

The energy grade line of the storm drain pipe system is lower than the finish surface grades.

The downstream storm drain pipe is sized to have an outfall flow rate leaving the site to not exceed the proposed 100-yr flow.

5.0 Conclusion

The overall drainage patterns in the proposed condition are similar to the existing condition. However, the proposed drainage patterns are divided into multiple subareas as shown on the attached Hydrology Map – Proposed Condition. The subareas account for the ridges in the roof areas as well as the ground surfaces including the drive aisles, parking spaces, and landscape areas.

The proposed storm drain system has been designed for the 100-yr storm event. Because of the new development, there is an increase in the impervious areas and decrease in the pervious areas thus increasing the storm water runoff flow. However, as part of the SWQMP requirements, the proposed storm drain runoff flow is mitigated by implementing hydromodification requirements. Due to hydromodification Q post-development $\leq$ Q existing. Detailed hydromodification calculations are included in the approved SWQMP report, and are also included in Appendix E of this report for reference.

As part of the storm drain system two Biofiltration facilities and one detention basin are required to be constructed to collect all storm drain water and treat and mitigate the required volumes and flows before leaving the site per the current Storm Water Quality Mitigation Plan, Regional Water Quality Control Board, and MS4 Permit requirements. The proposed storm drain system will tie-in to the existing curb inlet catch basin located in Mystra Drive.

The detention has been designed detain volume of storm water to mitigate runoff between $0.1Q_2$ to Q_{10}. The basin is 6 feet deep with 2:1 side slopes and includes a riser 5 feet above the bottom of the basin. The overflow pipe downstream of the riser has been sized to handle a 100-year storm event. Therefore, the basin will have a 1 foot freeboard. Table 5 below provides a summary of the above ground detention basin.

Table 5 - Detention Basin Detail

Bottom Area (sf)	Side Slope (ft/ft)	Bottom Elevation (ft)	Top Elevation (ft)	Depth (ft)	Riser Rim Elevation (ft)	High Water Elevation (ft)	Maximum Water Elevation (ft)
3,945	2:1	383.00	389.00	6	388.00	388.00	5

The proposed basin design summarized in Table 6 above allows the peak flowrate to pass through the basin without over topping the basin.

Table 7 – Sump Pump Detail

Wet Well Depth (lf)	Wet Well Diameter (ft)	Wet Well Type	Rim Elevation (ft)	Bottom Elevation (ft)	Pump Type	Pump Capacity (gpm/each)	Total Pump Capacity (gpm)
12	10	Concrete	379.50	367.50	Dual	5,800	10,600

The proposed sump pump is sized to route 10-year storm water runoff of up to 10-year runoff into the basin. The pump system includes two large pumps to handle the 10-year flow and a nuisance pump to handle low flows as well as for draining the pump well. The large pumps are connected to a 12" pressure pipe each that eventually ties in to a 20" discharge pipe for reducing velocity at discharge point. Velocity at discharge point when pumps are running at full capacity at 85.2% efficiency is V = 6.13 FPS. During an storm event greater than 10-yr, an overflow pipe with a 100-yr capacity is provided at the pump well to drain directly into the existing curb inlet catch basin located in Mystra Drive

The existing storm drain system in Mystra and Cannon was designed as part of the residential development of the surrounding area. A 24" RCP pipe stub was provided within the subject property in order to provide drainage into the existing system for future connection. Existing Q is 5.53 CFS. Due to hydromodification of the site runoff, proposed flow from the site is mitigated to not increase above 5.53 CFS. Therefore, there will be no adverse impact on the existing storm drain system.

Appendix A – Hydrology Calculations

Existing Hydrology Calculations

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Existing Area 1

A_T = 240,605 sf = 5.52 ac
A_P = 240,605 sf = 5.52 ac
A_I = 0 sf = 0.00 ac

% Impervious = 0.00

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.25

C = 0.25

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.25
D = 350 ft
s = 2.2 %

T = 22.01 min

Calculate intensity (I) per Figure 3.2.

I = $7.44 \cdot P_6 \cdot T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.42 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.03 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.53 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.04 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 240,605 sf = 5.524 acres

Q_2 = 1.96 cfs

Q_{10} = 2.80 cfs

Q_{50} = 3.50 cfs

Q_{100} = 4.20 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Existing Area 2

A_T = 23,398 sf = 0.54 ac
A_P = 23,398 sf = 0.54 ac
A_I = 0 sf = 0.00 ac

% Impervious = 0.00

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.25

C = 0.25

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2))]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.25
D = 350 ft
s = 2.2 %

T = 22.01 min

Calculate intensity (I) per Figure 3.2.

I = $7.44 \cdot P_6 \cdot T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.42 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.03 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.53 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.04 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 23,398 sf = 0.537 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 0.19 cfs

Q_{10} = 0.27 cfs

Q_{50} = 0.34 cfs

Q_{100} = 0.41 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Existing Area 3

A_T = 17,428 sf = 0.40 ac
A_P = 9,032 sf = 0.21 ac
A_I = 8,396 sf = 0.19 ac

% Impervious = 48%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.56

C = 0.73

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.73
D = 350 ft
s = 2.2 %

T = 9.69 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.41 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 3.44 in/hr

Selected frequency = 50 years

P_6 =	2.5	in	per Appendix B	
P_{24} =	4.5	in	per Appendix B	
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 4.30 in/hr

Selected frequency = 100 years

P_6 =	3.0	in	per Appendix B
P_{24} =	5.0	in	per Appendix B
P_6/P_{24} =	60.00	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 5.16 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 17,428 sf = 0.4 acres

Q_2 = 0.70 cfs

Q_{10} = 1.00 cfs

Q_{50} = 1.25 cfs

Q_{100} = 1.50 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Table 2 - Summary of Existing Flow

Existing Area	Q (cfs)				Area	
	2 -year	10-year	50-year	100-year	(sf)	(ac)
1	1.96	2.80	3.50	4.20	240,605	5.52
2	0.19	0.27	0.34	0.41	23,398	0.54
3	0.70	1.00	1.25	1.50	17,428	0.40

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Table 5 - Pre- and Post-Construction Flows

Storm Event	Existing Q (cfs)	Proposed Q (cfs)
2-yr	2.58	16.65
10-yr	3.68	23.78
50-yr	4.60	29.72
100 -yr	5.53	35.67

Proposed Hydrology Calculations

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area A1

A_T = 16,405 sf
A_P = 3,281 sf
A_I = 13,124 sf

% Impervious = 0.80

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 77%

C = 0.75

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.75
D = 230 ft
s = 2.4 %

T = 7.14 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.93 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 4.19 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 5.24 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 6.28 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 16,405 sf = 0.377 acres

Q_2 = 0.83 cfs

Q_{10} = 1.18 cfs

Q_{50} = 1.48 cfs

Q_{100} = 1.77 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area A2

A_T = 3,256 sf
A_P = 843 sf
A_I = 2,413 sf

% Impervious = 74%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.73

C = 0.86

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.86
D = 30 ft
s = 33 %

T = 0.75 min

Calculate intensity (I) per Figure 3.2.

I = $7.44 \cdot P_6 \cdot T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 12.54 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 17.91 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 22.39 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 26.87 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 3,256 sf = 0.075 acres

Q_2 = 0.80 cfs

Q_{10} = 1.15 cfs

Q_{50} = 1.43 cfs

Q_{100} = 1.72 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area A3

A_T = 3,035 sf
A_P = 726 sf
A_I = 2,309 sf

% Impervious = 76%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.74

C = 0.86

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.86
D = 30 ft
s = 33 %

T = 0.73 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 12.76 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 18.23 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 22.79 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 27.34 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 3,035 sf = 0.07 acres

Q_2 = 0.77 cfs

Q_{10} = 1.10 cfs

Q_{50} = 1.37 cfs

Q_{100} = 1.64 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area B1

A_T = 8,254 sf
A_P = 0 sf
A_I = 8,254 sf

% Impervious = 100%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type
(shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.87

C = 0.90

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.90
D = 190 ft
s = 1.7 %

T = 4.16 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 4.15 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 5.94 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 7.42 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 8.90 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 8,254 sf = 0.189 acres

Q_2 = 0.71 cfs

Q_{10} = 1.01 cfs

Q_{50} = 1.27 cfs

Q_{100} = 1.52 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area B2

A_T = 976 sf
A_P = 637 sf
A_I = 339 sf

% Impervious = 35%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.48

C = 0.63

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.63
D = 20 ft
s = 33 %

T = 1.19 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 9.31 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 13.30 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 16.63 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 19.95 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 976 sf = 0.022 acres

Q_2 = 0.13 cfs

Q_{10} = 0.19 cfs

Q_{50} = 0.23 cfs

Q_{100} = 0.28 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area B3

A_T = 3,978 sf
A_P = 821 sf
A_I = 3,157 sf

% Impervious = 79%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

$C = 0.90 \times (\%\ \text{Impervious}) + C_p \times (1 - \%\ \text{Impervious})$

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.76

C = 0.87

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2))]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.87
D = 24 ft
s = 33 %

T = 0.63 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 14.07 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 20.10 in/hr

Selected frequency = 50 years

P_6 =	2.5	in		per Appendix B
P_{24} =	4.5	in		per Appendix B
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 25.12 in/hr

Selected frequency =	100	years		
P_6 =	3.0	in		per Appendix B
P_{24} =	5.0	in		per Appendix B
P_6/P_{24} =	60.00	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 30.15 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 3,978 sf = 0.091 acres

Q_2 =	**1.12**	**cfs**
Q_{10} =	**1.60**	**cfs**
Q_{50} =	**2.00**	**cfs**
Q_{100} =	**2.40**	**cfs**

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area B4

A_T = 3,567 sf
A_P = 1,166 sf
A_I = 2,401 sf

% Impervious = 67%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.68

C = 0.83

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.83
D = 36 ft
s = 33 %

T = 0.91 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 11.05 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 15.79 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 19.74 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 23.69 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 3,567 sf = 0.082 acres

Q_2 = 0.75 cfs

Q_{10} = 1.07 cfs

Q_{50} = 1.34 cfs

Q_{100} = 1.61 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area 1C

A_T = 1,858 sf
A_P = 639 sf
A_I = 1,219 sf

% Impervious = 66%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.68

C = 0.82

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.82
D = 30 ft
s = 33 %

T = 0.85 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 11.56 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 16.51 in/hr

Selected frequency = 50 years

P_6 =	2.5	in	per Appendix B	
P_{24} =	4.5	in	per Appendix B	
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 20.64 in/hr

Selected frequency = 100 years

P_6 =	3.0	in	per Appendix B	
P_{24} =	5.0	in	per Appendix B	
P_6/P_{24} =	60.00	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 24.77 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 1,858 sf = 0.043 acres

Q_2 = 0.41 cfs

Q_{10} = 0.58 cfs

Q_{50} = 0.72 cfs

Q_{100} = 0.87 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area C2

A_T = 13,632 sf
A_P = 8,143 sf
A_I = 5,489 sf

% Impervious = 40%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.51

C = 0.67

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.67
D = 32 ft
s = 34 %

T = 1.36 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 8.54 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 12.20 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 15.25 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 18.30 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 13,632 sf = 0.313 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 1.78 cfs

Q_{10} = 2.55 cfs

Q_{50} = 3.18 cfs

Q_{100} = 3.82 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area D

A_T = 3,708 sf
A_P = 0 sf
A_I = 3,708 sf

% Impervious = 100%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.87

C = 0.90

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.90
D = 130 ft
s = 5 %

T = 2.40 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 5.92 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 8.46 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 10.57 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 12.69 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 3,708 sf = 0.085 acres

Q_2 = 0.45 cfs

Q_{10} = 0.65 cfs

Q_{50} = 0.81 cfs

Q_{100} = 0.97 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area E

A_T = 667 sf
A_P = 0 sf
A_I = 667 sf

% Impervious = 100%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.87

C = 0.90

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.90
D = 210 ft
s = 0.5 %

T = 6.57 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44*P_6*T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 3.09 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 4.42 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 5.52 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 6.63 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 667 sf = 0.015 acres

Q_2 = 0.04 cfs

Q_{10} = 0.06 cfs

Q_{50} = 0.08 cfs

Q_{100} = 0.09 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area F1

A_T = 10,416 sf
A_P = 558 sf
A_I = 9,858 sf

% Impervious = 95%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.87

C = 0.90

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.90
D = 188 ft
s = 3.2 %

T = 3.38 min

Calculate intensity (I) per Figure 3.2.

I = $7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 4.75 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 6.79 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 8.48 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 10.18 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 10,416 sf = 0.239 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 1.02 cfs

Q_{10} = 1.46 cfs

Q_{50} = 1.82 cfs

Q_{100} = 2.19 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area F2

A_T = 3,486 sf
A_P = 2,027 sf
A_I = 1,459 sf

% Impervious = 42%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.52

C = 0.68

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.68
D = 16 ft
s = 33 %

T = 0.94 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44*P_6*T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 10.82 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 15.46 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 19.33 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 23.19 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 3,486 sf = 0.08 acres

Q_2 = 0.59 cfs

Q_{10} = 0.84 cfs

Q_{50} = 1.05 cfs

Q_{100} = 1.26 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area F3

A_T = 11,375 sf
A_P = 3,281 sf
A_I = 8,094 sf

% Impervious = 71%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.71

C = 0.85

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.85
D = 26 ft
s = 33 %

T = 0.73 min

Calculate intensity (I) per Figure 3.2.

I = $7.44*P_6*T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 12.77 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 18.24 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 22.80 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 27.36 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 11,375 sf = 0.261 acres

Q_2 = 2.82 cfs

Q_{10} = 4.03 cfs

Q_{50} = 5.03 cfs

Q_{100} = 6.04 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area G

A_T = 8,418 sf
A_P = 2,262 sf
A_I = 6,156 sf

% Impervious = 73%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.72

C = 0.85

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.85
D = 68 ft
s = 3.9 %

T = 2.33 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 6.03 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 8.61 in/hr

Selected frequency = 50 years

P_6 =	2.5	in	per Appendix B	
P_{24} =	4.5	in	per Appendix B	
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 10.77 in/hr

Selected frequency = 100 years

P_6 =	3.0	in	per Appendix B	
P_{24} =	5.0	in	per Appendix B	
P_6/P_{24} =	60.00	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 12.92 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 8,418 sf = 0.193 acres

Q_2 = 0.99 cfs

Q_{10} = 1.42 cfs

Q_{50} = 1.77 cfs

Q_{100} = 2.13 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area H1

A_T = 6,829 sf
A_P = 1,702 sf
A_I = 5,127 sf

% Impervious = 75%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.74

C = 0.86

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.86
D = 28 ft
s = 33 %

T = 0.71 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 12.93 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 18.48 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 23.10 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 27.72 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 6,829 sf = 0.157 acres

Q_2 = 1.74 cfs

Q_{10} = 2.49 cfs

Q_{50} = 3.11 cfs

Q_{100} = 3.73 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area H2

A_T = 5,411 sf
A_P = 1,348 sf
A_I = 4,063 sf

% Impervious = 75%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.74

C = 0.86

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.86
D = 32 ft
s = 33 %

T = 0.76 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44*P_6*T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 12.39 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 17.70 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 22.13 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 26.55 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 5,411 sf = 0.124 acres

Q_2 = 1.32 cfs

Q_{10} = 1.89 cfs

Q_{50} = 2.36 cfs

Q_{100} = 2.83 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area H3

A_T = 11,921 sf
A_P = 10,266 sf
A_I = 1,655 sf

% Impervious = 14%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.34

C = 0.42

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.42
D = 300 ft
s = 2 %

T = 16.80 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.69 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.41 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.01 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.62 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 11,921 sf = 0.274 acres

Q_2 = 0.19 cfs

Q_{10} = 0.28 cfs

Q_{50} = 0.35 cfs

Q_{100} = 0.42 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area I1

A_T = 23,081 sf
A_P = 6,652 sf
A_I = 16,429 sf

% Impervious = 71%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.71

C = 0.85

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.85
D = 28 ft
s = 33 %

T = 0.76 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44*P_6*T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 12.47 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 17.81 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B
P_{24} = 4.5 in per Appendix B
P_6/P_{24} = 55.56 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 22.27 in/hr

Selected frequency = 100 years
P_6 = 3.0 in per Appendix B
P_{24} = 5.0 in per Appendix B
P_6/P_{24} = 60.00 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 26.72 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 23,081 sf = 0.53 acres

Q_2 = 5.58 cfs
Q_{10} = 7.98 cfs
Q_{50} = 9.97 cfs
Q_{100} = 11.97 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area L

A_T = 8,837 sf
A_P = 8,730 sf
A_I = 107 sf

% Impervious = 1%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.25

C = 0.26

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.26
D = 10 ft
s = 4 %

T = 3.02 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 5.11 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 7.30 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B
P_{24} = 4.5 in per Appendix B
P_6/P_{24} = 55.56 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 9.12 in/hr

Selected frequency = 100 years
P_6 = 3.0 in per Appendix B
P_{24} = 5.0 in per Appendix B
P_6/P_{24} = 60.00 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 10.94 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 8,837 sf = 0.203 acres

Q_2 = 0.27 cfs
Q_{10} = 0.38 cfs
Q_{50} = 0.48 cfs
Q_{100} = 0.57 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area J

A_T = 543 sf
A_P = 0 sf
A_I = 543 sf

% Impervious = 100%

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.87

C = 0.90

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.90
D = 320 ft
s = 1 %

T = 6.44 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44*P_6*T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 3.13 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 4.48 in/hr

Selected frequency = 50 years

P_6 =	2.5	in		per Appendix B
P_{24} =	4.5	in		per Appendix B
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 5.59 in/hr

Selected frequency =	100	years		
P_6 =	3.0	in		per Appendix B
P_{24} =	5.0	in		per Appendix B
P_6/P_{24} =	60.00	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 6.71 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 543 sf = 0.012 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 0.04 cfs

Q_{10} = 0.05 cfs

Q_{50} = 0.06 cfs

Q_{100} = 0.08 cfs

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Area K

A_T = 127,003 sf
A_P = 127,003 sf
A_I = 0 sf

% Impervious = 0.00

Soil Type = B (Soil Type B, Soil type can be determined from the soil type map provided in Appendix A.)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.25

C = 0.25

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.25
D = 350 ft
s = 2.2 %

T = 22.01 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.42 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.03 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.53 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.04 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 127,003 sf = 2.916 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 1.03 cfs

Q_{10} = 1.48 cfs

Q_{50} = 1.85 cfs

Q_{100} = 2.22 cfs

Appendix B – Hydraulics Calculations

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE X

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.83 ft
r = 0.42 ft

R = A/P
A = 0.54 ft^2
P = 2.61 ft
R = 0.21 ft

S = 0.85% = 0.0085 ft/ft
n = 0.010

Q_{pipe} = 2.61 cfs

For Parcel 2 Q_{100} = 2.22 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE A1

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.25 ft
r = 0.63 ft

R = A/P
A = 1.23 ft^2
P = 3.93 ft
R = 0.31 ft

S = 0.75% = 0.008 ft/ft
n = 0.010

Q_{pipe} = 7.29 cfs

For Areas A1, A2, A3 Q_{100} = 5.14 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE A2

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.83 ft
r = 0.42 ft

R = A/P
A = 0.55 ft^2
P = 2.62 ft
R = 0.21 ft

S = 0.50% = 0.005 ft/ft
n = 0.010

Q_{pipe} = 2.02 cfs

For Area A2 Q_{100} = 1.72 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE A3

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.83 ft
r = 0.42 ft

R = A/P
A = 0.54 ft^2
P = 2.61 ft
R = 0.21 ft

S = 0.50% = 0.005 ft/ft
n = 0.010

Q_{pipe} = 2.00 cfs

For Area A3 Q_{100} = 1.64 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE B

Q_{pipe} =	$(1.49/n)*A*R^{2/3}*S^{1/2}$		Where	Q_{pipe} = existing peak flows, cfs
				n = Manning's roughness coefficient
d =	1.50	ft		0.010 for PVC
r =	0.75	ft		A = sectional area, ft^2
				R = wetted radius, ft
R =	A/P			S = slope, ft/ft
A =	1.77	ft^2		
P =	4.71	ft		P = cross-section perimeter of existing pipe, ft
R =	0.38	ft		d = cross-section diameter of existing pipe, ft
				r = cross-section radius of existing pipe, ft

S = 1.00% = 0.010 ft/ft
n = 0.010

Q_{pipe} = 13.69 cfs

For Area B Q_{100} = 10.94 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE B1

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.83 ft
r = 0.42 ft

R = A/P
A = 0.55 ft^2
P = 2.62 ft
R = 0.21 ft

S = 5.00% = 0.050 ft/ft
n = 0.010

Q_{pipe} = 6.39 cfs

For Area B1 Q_{100} = 5.81 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE B2

Q_{pipe} =	$(1.49/n)*A*R^{2/3}*S^{1/2}$		Where	Q_{pipe} = existing peak flows, cfs
				n = Manning's roughness coefficient
d =	0.50	ft		0.010 for PVC
r =	0.25	ft		A = sectional area, ft^2
				R = wetted radius, ft
R =	A/P			S = slope, ft/ft
A =	0.20	ft^2		
P =	1.57	ft		P = cross-section perimeter of existing pipe, ft
R =	0.13	ft		d = cross-section diameter of existing pipe, ft
				r = cross-section radius of existing pipe, ft

S = 1.00% = 0.010 ft/ft

n = 0.010

Q_{pipe} = 0.73 cfs

For Area B2 Q_{100} = 0.28 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE B3

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

d = 0.83 ft
r = 0.42 ft

R = A/P
A = 0.54 ft^2
P = 2.61 ft
R = 0.21 ft

S = 2.00% = 0.020 ft/ft
n = 0.010

Q_{pipe} = 4.00 cfs

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

For Area B3 Q_{100} = 2.40 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE B4

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.83 ft
r = 0.42 ft

R = A/P
A = 0.54 ft^2
P = 2.61 ft
R = 0.21 ft

S = 2.00% = 0.020 ft/ft
n = 0.010

Q_{pipe} = 4.00 cfs

For Areas B2,B3 Q_{100} = 2.68 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE AB

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.25 ft
r = 0.63 ft

R = A/P
A = 1.23 ft^2
P = 3.93 ft
R = 0.31 ft

S = 1.00% = 0.010 ft/ft
n = 0.010

Q_{pipe} = 8.42 cfs

For Area A, B Q_{100} = 5.81 cfs

$Q_{pipe} > Q_{100}$ Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE C

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.50 ft
r = 0.75 ft

R = A/P
A = 1.77 ft^2
P = 4.71 ft
R = 0.38 ft

S = 8.00% = 0.0800 ft/ft
n = 0.010

Q_{pipe} = 38.73 cfs

For Area A, B, C Q_{100} = 15.63 cfs

Q_{pipe} > Q_{100} Therefore, OK.

V = Q/A
V = 21.92 ft/sec

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE C1

$Q_{pipe} = (1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.67 ft
r = 0.33 ft

R = A/P
A = 0.35 ft^2
P = 2.09 ft
R = 0.17 ft

S = 0.50% = 0.005 ft/ft
n = 0.010

Q_{pipe} = 1.11 cfs

For Area C1 Q_{100} = 0.87 cfs

$Q_{pipe} > Q_{100}$ Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE C2

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.67 ft
r = 0.33 ft

R = A/P
A = 0.35 ft^2
P = 2.09 ft
R = 0.17 ft

S = 8.00% = 0.080 ft/ft
n = 0.010

Q_{pipe} = 4.46 cfs

For Area C2 Q_{100} = 3.82 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE C

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.50 ft
r = 0.75 ft

R = A/P
A = 1.77 ft^2
P = 4.71 ft
R = 0.38 ft

S = 0.95% = 0.010 ft/ft
n = 0.010

Q_{pipe} = 13.35 cfs

For Area A, B, C Q_{100} = 15.63 cfs

Q_{pipe} > Q_{100} Therefore, OK.

d = 1.00 ft
r = 0.50 ft

R = A/P
A = 0.79 ft^2
P = 3.14 ft
R = 0.25 ft

S = 0.50% = 0.005 ft/ft
n = 0.010

Q_{pipe} = 3.28 cfs Q_{100} = 3.91 cfs

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE D

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.50 ft
r = 0.25 ft

R = A/P
A = 0.20 ft^2
P = 1.57 ft
R = 0.13 ft

S = 2.00% = 0.020 ft/ft
n = 0.010

Q_{pipe} = 1.03 cfs

For Area D Q_{100} = 0.97 cfs

Q_{pipe} > Q_{100} Therefore, OK.

V = Q/A
V = 5.27 ft/sec

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE F1

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.67 ft
r = 0.33 ft

R = A/P
A = 0.35 ft^2
P = 2.09 ft
R = 0.17 ft

S = 2.00% = 0.020 ft/ft
n = 0.010

Q_{pipe} = 2.23 cfs

For Area F1, F2, F3 Q_{100} = 2.19 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE F2

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.83 ft
r = 0.42 ft

R = A/P
A = 0.54 ft^2
P = 2.61 ft
R = 0.21 ft

S = 2.00% = 0.020 ft/ft
n = 0.010

Q_{pipe} = 4.00 cfs

For Area F2 Q_{100} = 1.26 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE F3

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$	Where	Q_{pipe} = existing peak flows, cfs	
		n = Manning's roughness coefficient	
d = 1.00 ft		0.010 for	PVC
r = 0.50 ft		A = sectional area, ft^2	
		R = wetted radius, ft	
R = A/P		S = slope, ft/ft	
A = 0.79 ft^2			
P = 3.14 ft		P = cross-section perimeter of existing pipe, ft	
R = 0.25 ft		d = cross-section diameter of existing pipe, ft	
		r = cross-section radius of existing pipe, ft	

S = 2.00% = 0.020 ft/ft
n = 0.010

Q_{pipe} = 6.57 cfs

For Area F3 Q_{100} = 6.04 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE F4

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$		Where	Q_{pipe} = existing peak flows, cfs
			n = Manning's roughness coefficient
d =	1.50 ft		0.010 for PVC
r =	0.75 ft		A = sectional area, ft^2
			R = wetted radius, ft
R = A/P			S = slope, ft/ft
A =	1.77 ft^2		
P =	4.71 ft		P = cross-section perimeter of existing pipe, ft
R =	0.38 ft		d = cross-section diameter of existing pipe, ft
			r = cross-section radius of existing pipe, ft

S = 1.20% = 0.012 ft/ft
n = 0.010

Q_{pipe} = 15.00 cfs

For Area F3 Q_{100} = 9.49 cfs

Q_{pipe} > Q_{100} Therefore, OK.

V = 8.49

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE G

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$	Where	Q_{pipe} = existing peak flows, cfs	
		n = Manning's roughness coefficient	
d = 0.67 ft		0.010 for	PVC
r = 0.33 ft		A = sectional area, ft^2	
		R = wetted radius, ft	
R = A/P		S = slope, ft/ft	
A = 0.35 ft^2			
P = 2.09 ft		P = cross-section perimeter of existing pipe, ft	
R = 0.17 ft		d = cross-section diameter of existing pipe, ft	
		r = cross-section radius of existing pipe, ft	

S = 3.00% = 0.030 ft/ft
n = 0.010

Q_{pipe} = 2.73 cfs

For Area H1 Q_{100} = 2.13 cfs

Q_{pipe} > Q_{100} Therefore, OK.

8

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE H1

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.83 ft
r = 0.42 ft

R = A/P
A = 0.54 ft^2
P = 2.61 ft
R = 0.21 ft

S = 2.00% = 0.020 ft/ft
n = 0.010

Q_{pipe} = 4.00 cfs

For Area H1 Q_{100} = 3.73 cfs

$Q_{pipe} > Q_{100}$ Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE H2

$Q_{pipe} = (1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.00 ft
r = 0.50 ft

R = A/P
A = 0.79 ft^2
P = 3.14 ft
R = 0.25 ft

S = 2.50% = 0.025 ft/ft
n = 0.010

Q_{pipe} = 7.34 cfs

For Area H1, H2 Q_{100} = 6.57 cfs

$Q_{pipe} > Q_{100}$ Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE I1

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.25 ft
r = 0.63 ft

R = A/P
A = 1.23 ft^2
P = 3.93 ft
R = 0.31 ft

S = 4.95% = 0.0495 ft/ft
n = 0.010

Q_{pipe} = 18.73 cfs

For Area I Q_{100} = 11.97 cfs

Q_{pipe} > Q_{100} Therefore, OK.

V = Q/A
V = 15.27 ft/sec

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

BIOFILTRATION 1

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 2.00 ft
r = 1.00 ft

R = A/P
A = 3.14 ft^2
P = 6.28 ft
R = 0.50 ft

S = 0.50% = 0.005 ft/ft
n = 0.010

Q_{pipe} = 20.85 cfs

For Area F, G, H and I Q_{100} = 30.57 cfs

Q_{pipe} > Q_{100} Therefore, OK.

d = 1.00 ft
r = 0.50 ft

R = A/P
A = 0.79 ft^2
P = 3.14 ft
R = 0.25 ft

S = 1.00% = 0.010 ft/ft
n = 0.010

Q_{pipe} = 4.64 cfs Q_{100} = 6.11 cfs

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE W

$Q_{pipe} = (1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.013 for RCP
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 2.00 ft
r = 1.00 ft

R = A/P
A = 3.14 ft^2
P = 6.28 ft
R = 0.50 ft

S = 45.00% = 0.450 ft/ft
n = 0.013

Q_{pipe} = 152.16 cfs

For all Areas Q_{100} = 47.92 cfs

$Q_{pipe} > Q_{100}$ Therefore, OK.

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

LINE AA

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

d = 1.50 ft
r = 0.75 ft

R = A/P
A = 1.77 ft^2
P = 4.71 ft
R = 0.38 ft

S = 5.00% = 0.050 ft/ft
n = 0.013

Q_{pipe} = 23.55 cfs

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.013 for RCP
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

For Detention Basin Spill Q_{10} = 33.42 cfs

Q_{pipe} > Q_{10} Therefore, OK.

V = Q/A

V = 13.33 ft/sec

HYDRAULICS CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

For Area F, G, H Q_{100} = 18.60 cfs

$Q_{channel}$ = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.013 for RCP
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

b = 1.5 ft
y = 1.5 ft

R = A/P

A = by
P = by/(b+2y)

A = 2.25 ft^2
P = 4.50 ft
R = 0.50 ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

S = 1.15% = 0.012 ft/ft
n = 0.013

$Q_{channel}$ = 17.42 cfs

For Area F, G, H Q_{100} = 18.60 cfs

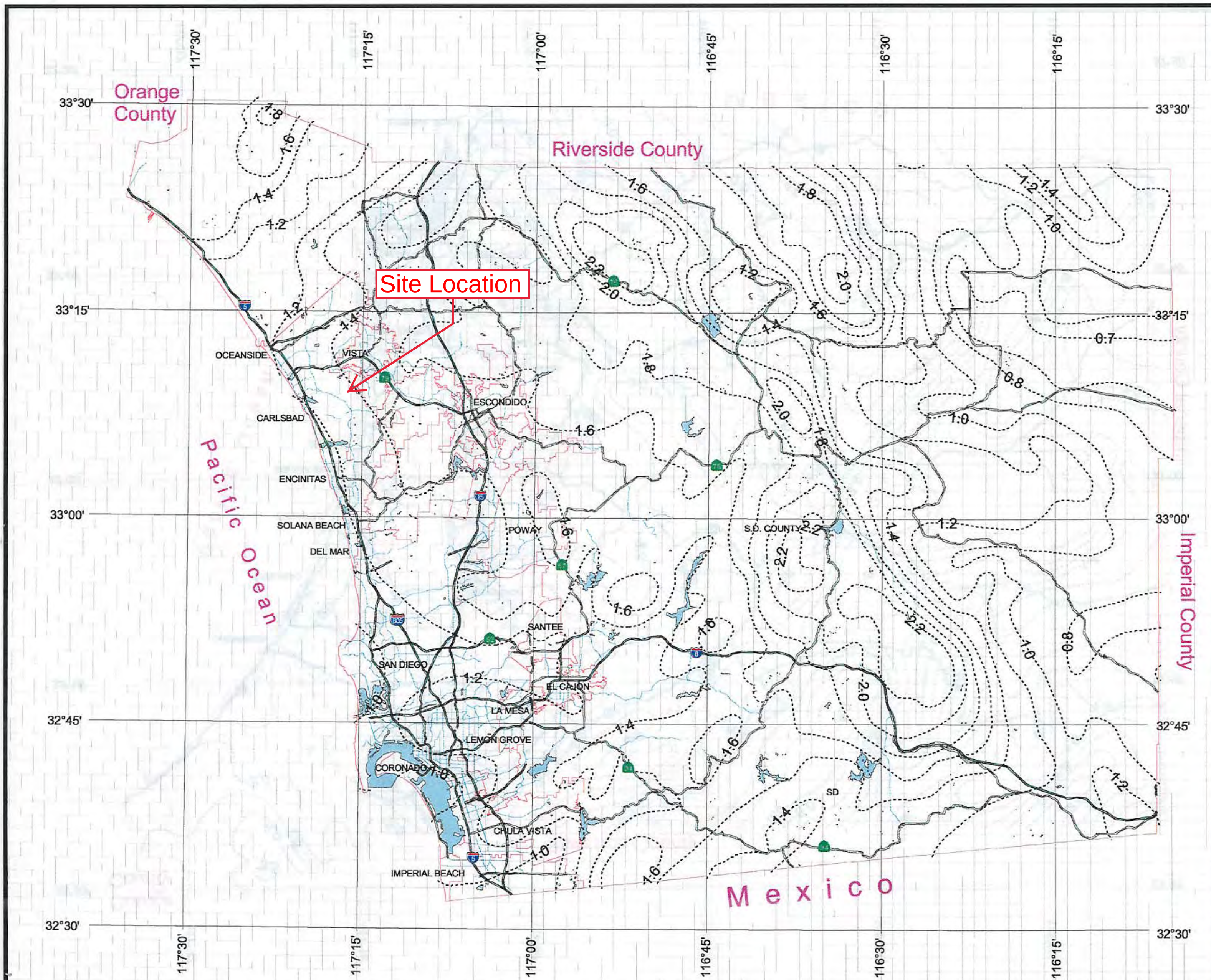
Q_{pipe} > Q_{100} Therefore, OK.

V = Q/A
V = 7.74 ft/sec

HYDROLOGY CALCULATIONS
NEC OF MYSTRA WAY & CANNON ROAD

Subarea	Q (cfs)				Area	
	2-year	10-year	50-year	100-year	(sf)	(ac)
A1	0.83	1.18	1.48	1.77	16,405	0.38
A2	0.80	1.15	1.43	1.72	3,256	0.07
A3	0.77	1.10	1.37	1.64	3,035	0.07
B1	0.71	1.01	1.27	1.52	8,254	0.19
B2	0.13	0.19	0.23	0.28	976	0.02
B3	1.12	1.60	2.00	2.40	3,978	0.09
B4	0.75	1.07	1.34	1.61	3,567	0.08
C1	0.41	0.58	0.72	0.87	1,858	0.04
C2	1.78	2.55	3.18	3.82	13,632	0.31
D	0.45	0.65	0.81	0.97	3,708	0.09
E	0.04	0.06	0.08	0.09	667	0.02
F1	1.02	1.46	1.82	2.19	10,416	0.24
F2	0.59	0.84	1.05	1.26	3,486	0.08
F3	2.82	4.03	5.03	6.04	11,375	0.26
G	0.99	1.42	1.77	2.13	8,418	0.19
H1	1.74	2.49	3.11	3.73	6,829	0.16
H2	1.32	1.89	2.36	2.83	5,411	0.12
H3	0.19	0.28	0.35	0.42	11,921	0.27
I	5.58	7.98	9.97	11.97	23,081	0.53
L	0.27	0.38	0.48	0.57	8,837	0.20
J	0.04	0.05	0.06	0.08	543	0.01
K	1.03	1.48	1.85	2.22	127,003	2.92
Total	**23.39**	**33.42**	**41.78**	**50.13**	**276,656**	**6.35**

Appendix C – Reference Figures and Tables



County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 6 Hours

------- Isopluvial (inches)

DPW GIS

SanGIS We Have San Diego Covered!

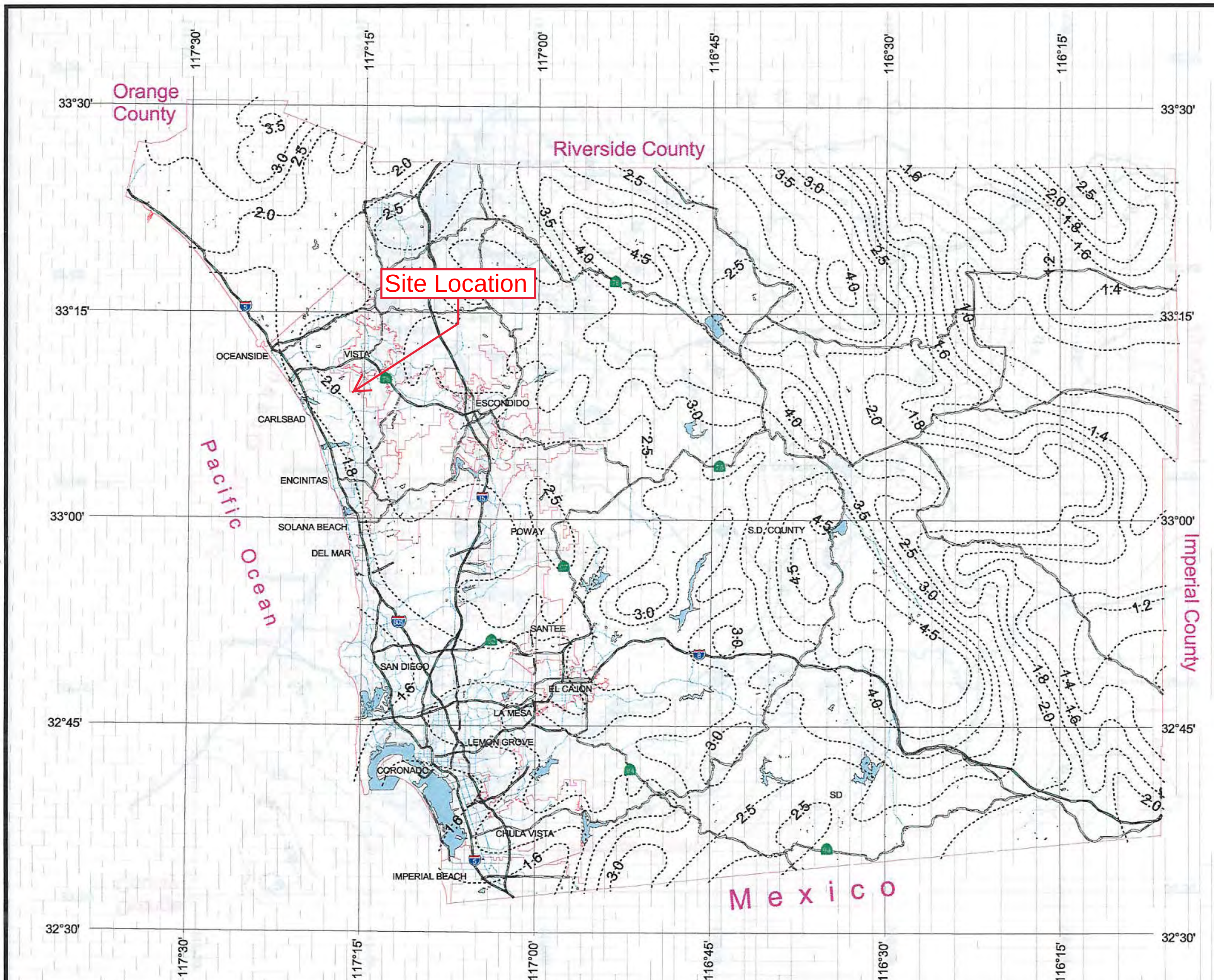
3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 24 Hours

------- Isopluvial (inches)



DPW GIS

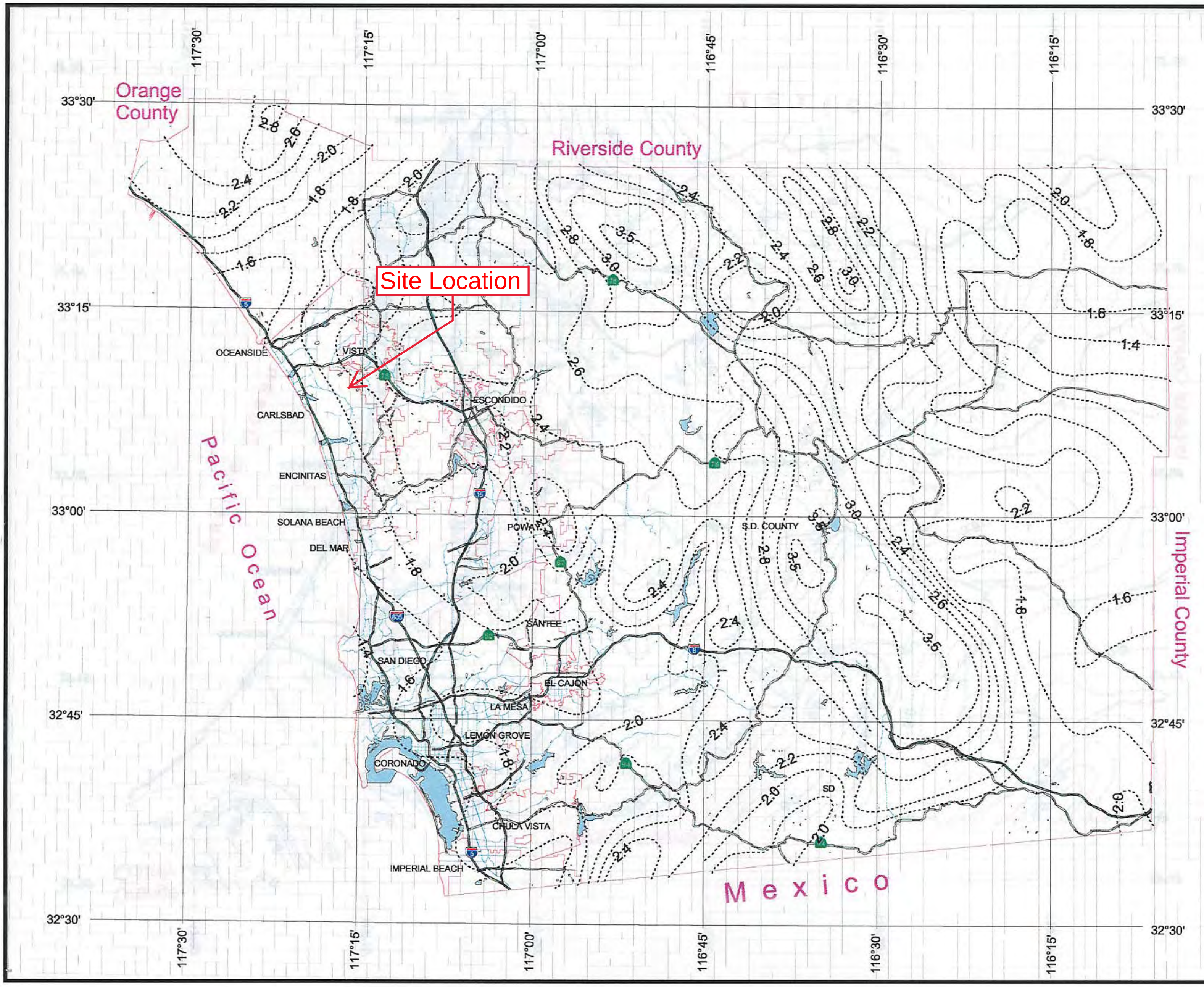
SanGIS
We Have San Diego Covered!

County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

Isopluvial (inches)



DPW GIS

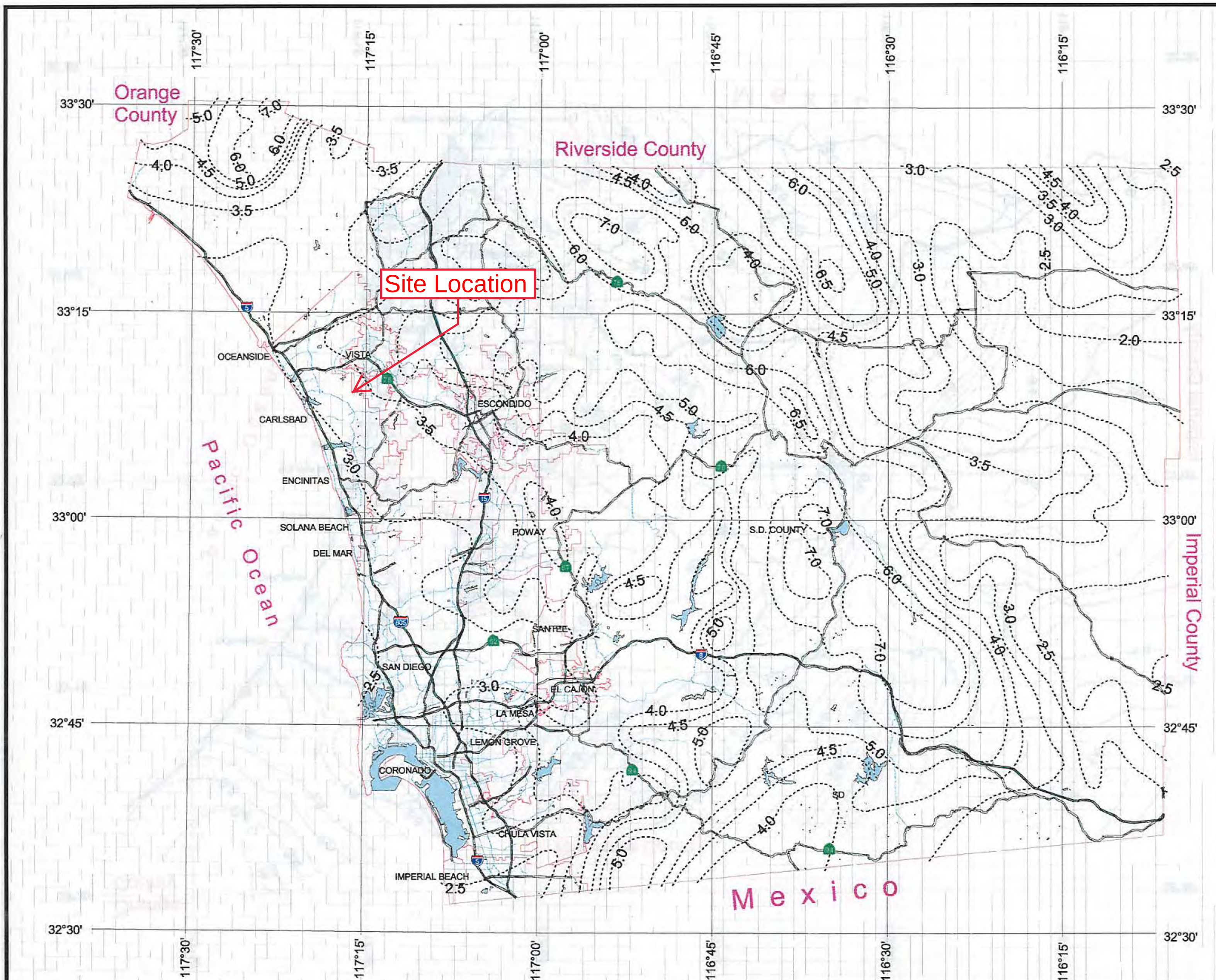
SanGIS We Have San Diego Covered!

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

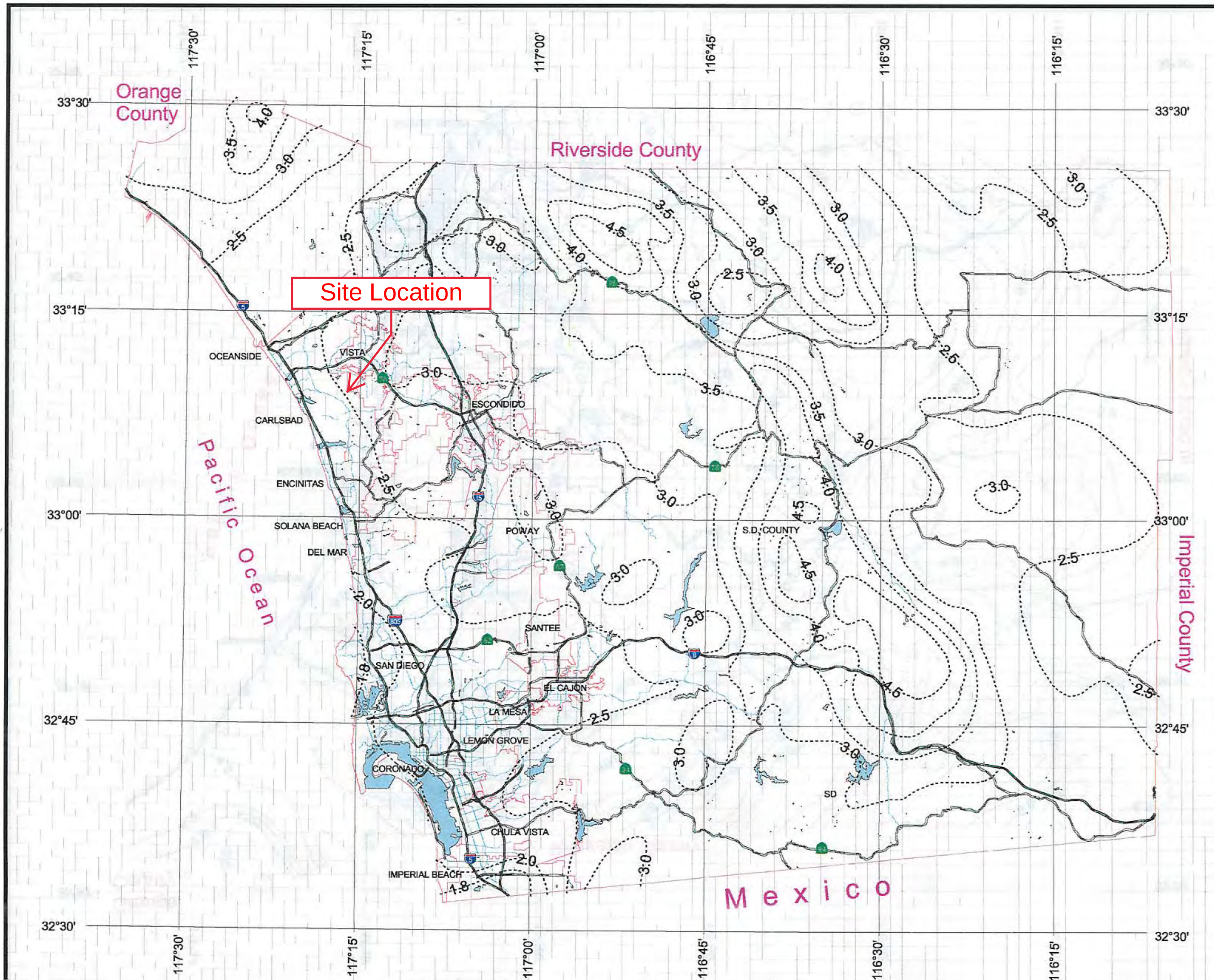
10 Year Rainfall Event - 24 Hours

--------	Isopluvial (inches)

DPW GIS
SanGIS
We Have San Diego Covered!

N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 6 Hours

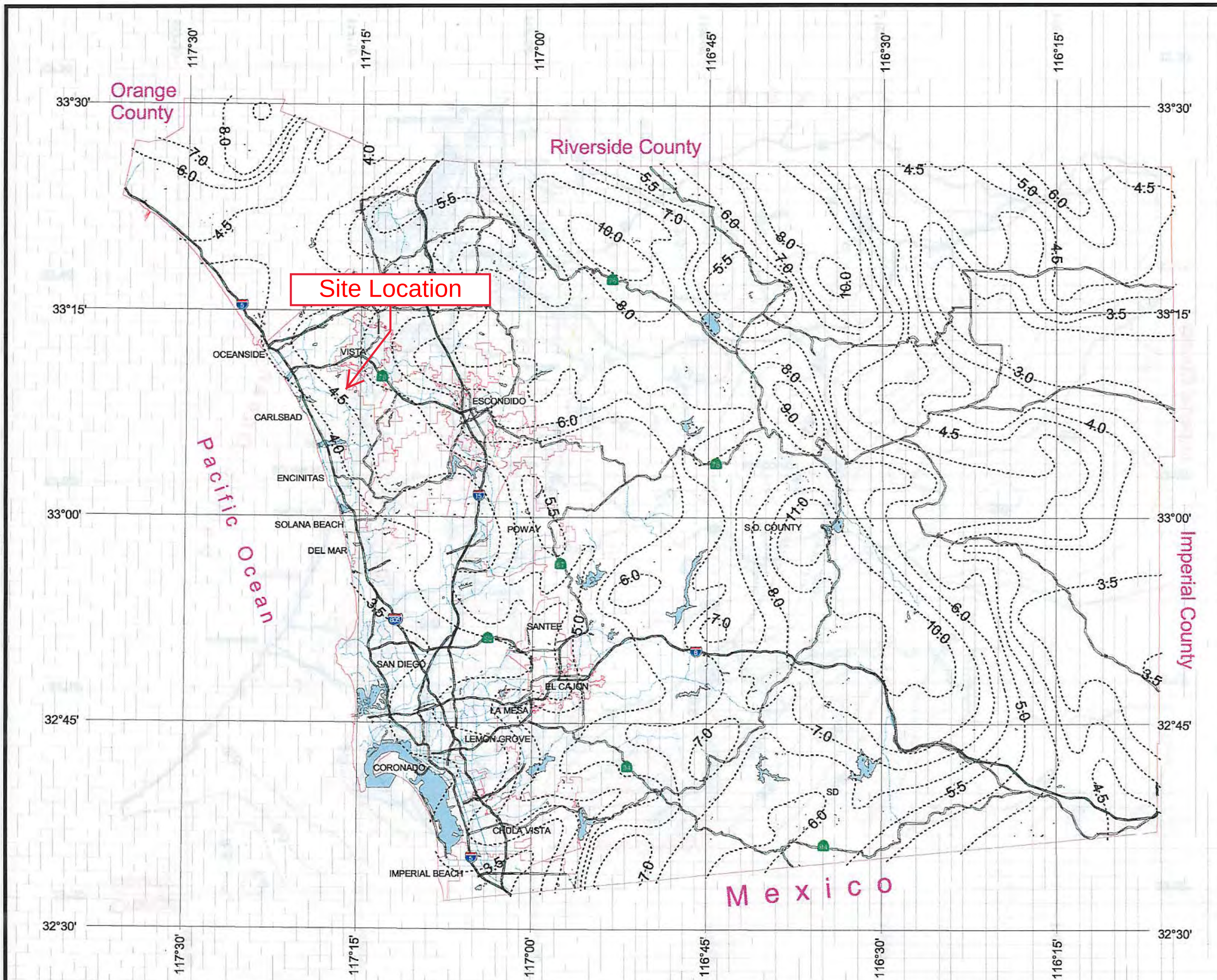
------- Isopluvial (inches)

DPW GIS
Department of Public Works Geographic Information Services

SanGIS
We Have San Diego Covered!

N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS

SanGIS
We Have San Diego Covered!

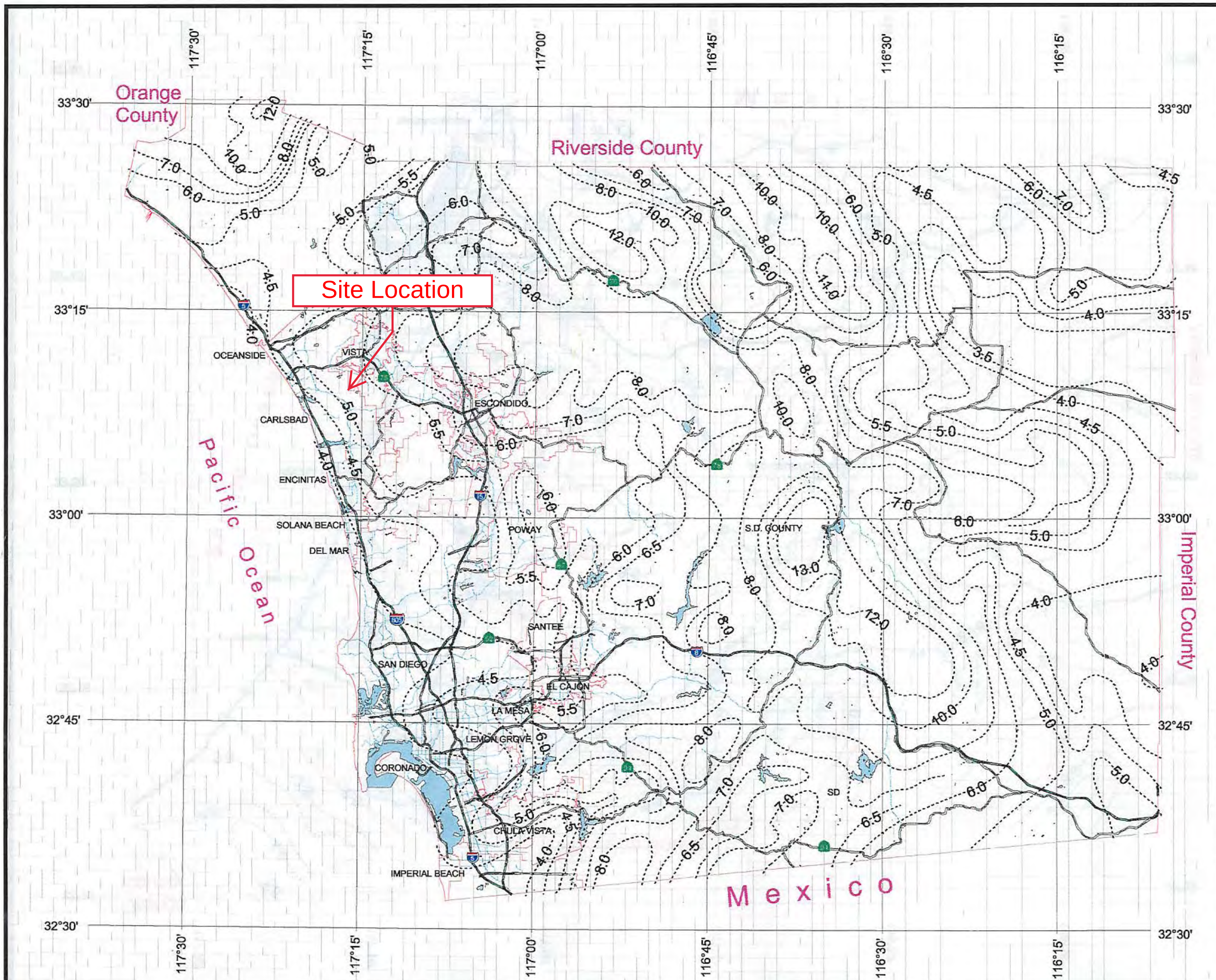
THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

N E S W

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

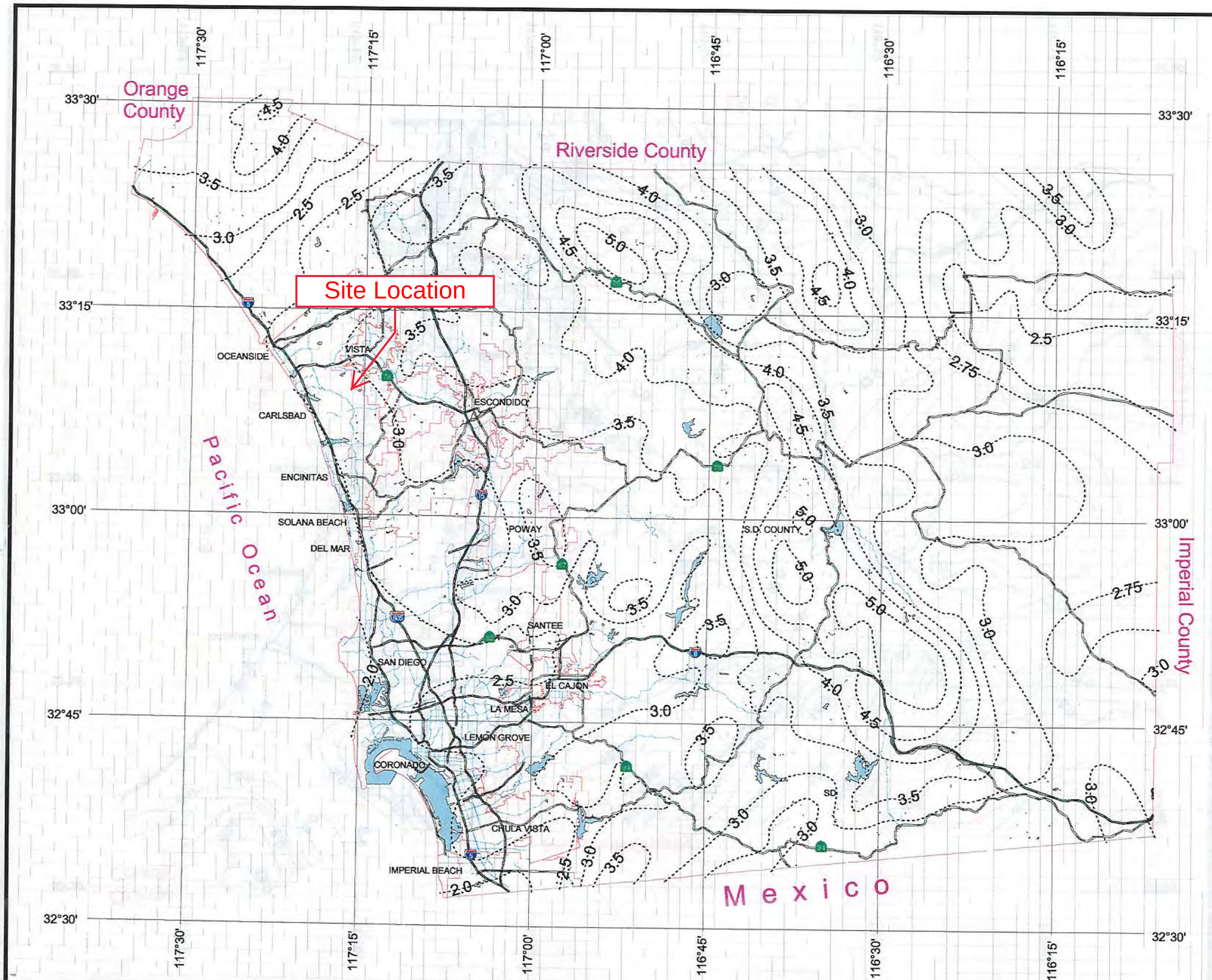
100 Year Rainfall Event - 24 Hours

------- Isopluvial (inches)

DPW GIS
SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

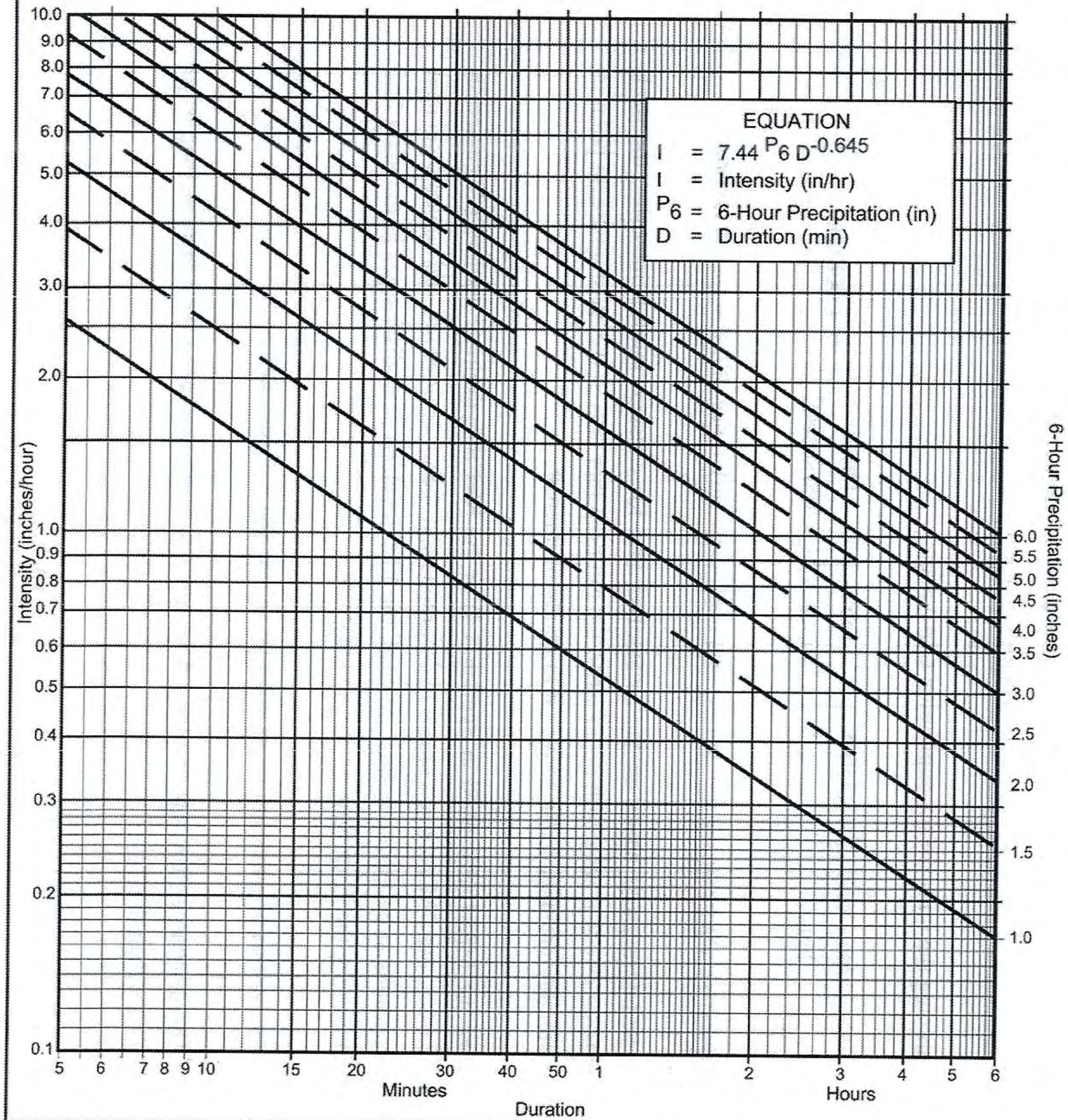
------- Isopluvial (inches)

DPW GIS

SanGIS
We Have San Diego Covered!

N S E W

3 0 3 Miles



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency ______ year

(b) P_6 = ______ in., P_{24} = ______, $\frac{P_6}{P_{24}}$ = ______ %(2)

(c) Adjusted $P_6^{(2)}$ = ______ in.

(d) t_x = ______ min.

(e) I = ______ in./hr.

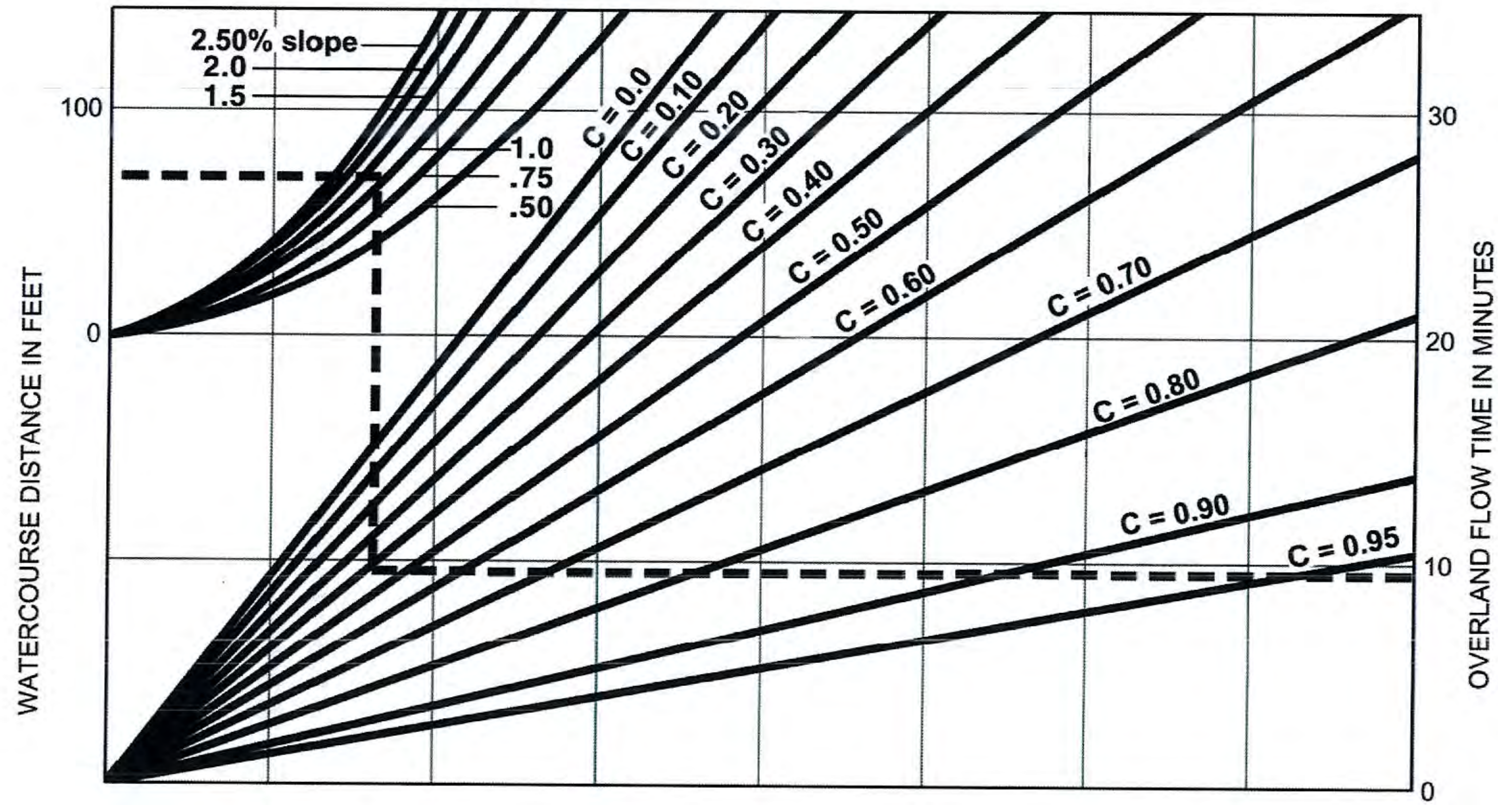
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE

3-1



EXAMPLE:

Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE **3-3**

Rational Formula - Overland Time of Flow Nomograph

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

Appendix D –Hydrology Maps

Appendix E – Hydromodification Calculations

SDHM 3.0

PROJECT REPORT

General Model Information

Project Name:	OCEANSIDE SENIOR LIVING BASIN 2017-10-09 w 1POC
Site Name:	OCEANSIDE SENIOR LIVING
Site Address:	NEC OF MYSTRA WAY AND CANNON ROAD
City:	OCEANSIDE
Report Date:	11/18/2017
Gage:	OCEANSID
Data Start:	10/01/1959
Data End:	09/30/2004
Timestep:	Hourly
Precip Scale:	1.000
Version Date:	2016/10/28

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data
Predeveloped Land Use

PRE DEVELOPED AREA

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C,NatVeg,Flat	3.24
C,NatVeg,Moderate	0.2
Pervious Total	3.44
Impervious Land Use	acre
Impervious Total	0
Basin Total	3.44

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

AREA 2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C,NatVeg,Flat	0.87
Pervious Total	0.87
Impervious Land Use	acre
IMPERVIOUS-FLAT	1.21
Impervious Total	1.21
Basin Total	2.08

Element Flows To:

Surface	Interflow	Groundwater
Bioretenti Surface 1	Bioretenti Surface 1	

AREA 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C,NatVeg,Flat	0.4
Pervious Total	0.4
Impervious Land Use	acre
IMPERVIOUS-FLAT	0.96
Impervious Total	0.96
Basin Total	1.36

Element Flows To:

Surface	Interflow	Groundwater
Bioretenti Surface 2	Bioretenti Surface 2	

Routing Elements
Predeveloped Routing

Mitigated Routing

Bioretention Basin 1

Bottom Length:	169.00 ft.
Bottom Width:	10.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	Amended 5 in/hr
Material thickness of second layer:	2
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Underdrain used	
Underdrain Diameter (feet):	1
Orifice Diameter (in.):	12
Offset (in.):	0
Flow Through Underdrain (ac-ft.):	41.404
Total Outflow (ac-ft.):	44.307
Percent Through Underdrain:	93.45

Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 8 in.
Element Flows To:
Outlet 1 Outlet 2
Pump

In Ground Planter Box Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0388	0.0000	0.0000	0.0000
0.0604	0.0388	0.0010	0.0000	0.0000
0.1209	0.0388	0.0020	0.0000	0.0000
0.1813	0.0388	0.0030	0.0000	0.0000
0.2418	0.0388	0.0039	0.0000	0.0000
0.3022	0.0388	0.0049	0.0000	0.0000
0.3626	0.0388	0.0059	0.0000	0.0000
0.4231	0.0388	0.0069	0.0000	0.0000
0.4835	0.0388	0.0079	0.0000	0.0000
0.5440	0.0388	0.0089	0.0000	0.0000
0.6044	0.0388	0.0098	0.0000	0.0000
0.6648	0.0388	0.0108	0.0000	0.0000
0.7253	0.0388	0.0118	0.0000	0.0000
0.7857	0.0388	0.0128	0.0000	0.0000
0.8462	0.0388	0.0138	0.0000	0.0000
0.9066	0.0388	0.0148	0.0000	0.0000
0.9670	0.0388	0.0158	0.0000	0.0000
1.0275	0.0388	0.0167	0.0000	0.0000
1.0879	0.0388	0.0177	0.0000	0.0000
1.1484	0.0388	0.0187	0.0000	0.0000
1.2088	0.0388	0.0197	0.0000	0.0000
1.2692	0.0388	0.0207	0.0000	0.0000
1.3297	0.0388	0.0217	0.0000	0.0000
1.3901	0.0388	0.0227	0.0000	0.0000
1.4505	0.0388	0.0236	0.0000	0.0000
1.5110	0.0388	0.0246	0.0000	0.0000
1.5714	0.0388	0.0256	0.0000	0.0000
1.6319	0.0388	0.0266	0.0000	0.0000
1.6923	0.0388	0.0275	0.0000	0.0000

1.7527	0.0388	0.0285	0.0000	0.0000
1.8132	0.0388	0.0295	0.0000	0.0000
1.8736	0.0388	0.0304	0.0000	0.0000
1.9341	0.0388	0.0314	0.0000	0.0000
1.9945	0.0388	0.0324	0.0000	0.0000
2.0549	0.0388	0.0334	0.0000	0.0000
2.1154	0.0388	0.0343	0.0000	0.0000
2.1758	0.0388	0.0353	0.0000	0.0000
2.2363	0.0388	0.0363	0.0000	0.0000
2.2967	0.0388	0.0373	0.0000	0.0000
2.3571	0.0388	0.0382	0.0000	0.0000
2.4176	0.0388	0.0392	0.0000	0.0000
2.4780	0.0388	0.0402	0.0000	0.0000
2.5385	0.0388	0.0412	0.0000	0.0000
2.5989	0.0388	0.0421	0.0000	0.0000
2.6593	0.0388	0.0431	0.0000	0.0000
2.7198	0.0388	0.0441	0.0000	0.0000
2.7802	0.0388	0.0450	0.0000	0.0000
2.8407	0.0388	0.0460	0.0000	0.0000
2.9011	0.0388	0.0470	0.0000	0.0000
2.9615	0.0388	0.0480	0.0000	0.0000
3.0220	0.0388	0.0489	0.0000	0.0000
3.0824	0.0388	0.0499	0.0000	0.0000
3.1429	0.0388	0.0509	0.0000	0.0000
3.2033	0.0388	0.0519	0.0000	0.0000
3.2637	0.0388	0.0528	0.0000	0.0000
3.3242	0.0388	0.0538	0.0000	0.0000
3.3846	0.0388	0.0548	0.0000	0.0000
3.4451	0.0388	0.0557	0.0000	0.0000
3.5000	0.0388	0.0566	0.0000	0.0000

In Ground Planter Box Hydraulic Table

Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**To Amended(cfs)**	**Infilt(cfs)**
3.5000	0.0388	0.0566	0.0000	0.2002	0.0000
3.5604	0.0388	0.0590	0.0000	0.2002	0.0000
3.6209	0.0388	0.0613	0.0000	0.2002	0.0000
3.6813	0.0388	0.0637	0.0005	0.2002	0.0000
3.7418	0.0388	0.0660	0.0012	0.2002	0.0000
3.8022	0.0388	0.0684	0.0023	0.2002	0.0000
3.8626	0.0388	0.0707	0.0039	0.2002	0.0000
3.9231	0.0388	0.0730	0.0060	0.2002	0.0000
3.9835	0.0388	0.0754	0.0062	0.2002	0.0000
4.0440	0.0388	0.0777	0.0087	0.2002	0.0000
4.1044	0.0388	0.0801	0.0121	0.2002	0.0000
4.1648	0.0388	0.0824	0.0162	0.2002	0.0000
4.2253	0.0388	0.0848	0.0209	0.2002	0.0000
4.2857	0.0388	0.0871	0.0255	0.2002	0.0000
4.3462	0.0388	0.0895	0.0265	0.2002	0.0000
4.4066	0.0388	0.0918	0.0329	0.2002	0.0000
4.4670	0.0388	0.0942	0.0401	0.2002	0.0000
4.5275	0.0388	0.0965	0.0482	0.2002	0.0000
4.5879	0.0388	0.0988	0.0572	0.2002	0.0000
4.6484	0.0388	0.1012	0.0621	0.2002	0.0000
4.7088	0.0388	0.1035	0.0672	0.2002	0.0000
4.7692	0.0388	0.1059	0.0781	0.2002	0.0000
4.8297	0.0388	0.1082	0.0900	0.2002	0.0000
4.8901	0.0388	0.1106	0.1030	0.2002	0.0000
4.9505	0.0388	0.1129	0.1171	0.2002	0.0000

5.0110	0.0388	0.1153	0.1195	0.2002	0.0000
5.0714	0.0388	0.1176	0.1322	0.2002	0.0000
5.1319	0.0388	0.1199	0.1484	0.2002	0.0000
5.1923	0.0388	0.1223	0.1658	0.2002	0.0000
5.2527	0.0388	0.1246	0.1843	0.2002	0.0000
5.3132	0.0388	0.1270	0.2002	0.2002	0.0000
5.3736	0.0388	0.1293	0.2002	0.2002	0.0000
5.4341	0.0388	0.1317	0.2002	0.2002	0.0000
5.4945	0.0388	0.1340	0.2002	0.2002	0.0000
5.5000	0.0388	0.1342	0.2002	0.2002	0.0000

Bioretenti Surface 1

Element Flows To:

Outlet 1	Outlet 2
Pump	Bioretention Basin 1

DETENTION BASIN

Bottom Length:	63.00 ft.	
Bottom Width:	63.00 ft.	
Depth:	6 ft.	
Volume at riser head:	0.6155 acre-feet.	
Side slope 1:	2 To 1	
Side slope 2:	2 To 1	
Side slope 3:	2 To 1	
Side slope 4:	2 To 1	
Discharge Structure		
Riser Height:	5 ft.	
Riser Diameter:	40.6 in.	
Orifice 1 Diameter:	0.8 in.	Elevation:0 ft.
Orifice 2 Diameter:	8 in.	Elevation:0.5 ft.
Orifice 3 Diameter:	8 in.	Elevation:2 ft.
Element Flows To:		
Outlet 1	Outlet 2	

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.091	0.000	0.000	0.000
0.0667	0.091	0.006	0.004	0.000
0.1333	0.092	0.012	0.006	0.000
0.2000	0.093	0.018	0.007	0.000
0.2667	0.094	0.024	0.009	0.000
0.3333	0.095	0.031	0.010	0.000
0.4000	0.095	0.037	0.011	0.000
0.4667	0.096	0.043	0.011	0.000
0.5333	0.097	0.050	0.329	0.000
0.6000	0.098	0.056	0.562	0.000
0.6667	0.099	0.063	0.723	0.000
0.7333	0.099	0.070	0.853	0.000
0.8000	0.100	0.076	0.966	0.000
0.8667	0.101	0.083	1.067	0.000
0.9333	0.102	0.090	1.160	0.000
1.0000	0.103	0.097	1.245	0.000
1.0667	0.103	0.103	1.325	0.000
1.1333	0.104	0.110	1.400	0.000
1.2000	0.105	0.117	1.472	0.000
1.2667	0.106	0.124	1.540	0.000
1.3333	0.107	0.132	1.605	0.000
1.4000	0.108	0.139	1.668	0.000
1.4667	0.108	0.146	1.728	0.000
1.5333	0.109	0.153	1.787	0.000
1.6000	0.110	0.161	1.843	0.000
1.6667	0.111	0.168	1.898	0.000
1.7333	0.112	0.176	1.951	0.000
1.8000	0.113	0.183	2.003	0.000
1.8667	0.114	0.191	2.054	0.000
1.9333	0.114	0.198	2.103	0.000
2.0000	0.115	0.206	2.151	0.000
2.0667	0.116	0.214	2.647	0.000
2.1333	0.117	0.221	2.879	0.000
2.2000	0.118	0.229	3.066	0.000
2.2667	0.119	0.237	3.231	0.000

2.3333	0.120	0.245	3.380	0.000
2.4000	0.121	0.253	3.519	0.000
2.4667	0.121	0.261	3.649	0.000
2.5333	0.122	0.269	3.772	0.000
2.6000	0.123	0.278	3.890	0.000
2.6667	0.124	0.286	4.002	0.000
2.7333	0.125	0.294	4.111	0.000
2.8000	0.126	0.303	4.216	0.000
2.8667	0.127	0.311	4.318	0.000
2.9333	0.128	0.320	4.416	0.000
3.0000	0.129	0.328	4.512	0.000
3.0667	0.130	0.337	4.606	0.000
3.1333	0.131	0.346	4.698	0.000
3.2000	0.131	0.354	4.787	0.000
3.2667	0.132	0.363	4.874	0.000
3.3333	0.133	0.372	4.960	0.000
3.4000	0.134	0.381	5.044	0.000
3.4667	0.135	0.390	5.127	0.000
3.5333	0.136	0.399	5.208	0.000
3.6000	0.137	0.408	5.287	0.000
3.6667	0.138	0.417	5.366	0.000
3.7333	0.139	0.427	5.443	0.000
3.8000	0.140	0.436	5.518	0.000
3.8667	0.141	0.445	5.593	0.000
3.9333	0.142	0.455	5.667	0.000
4.0000	0.143	0.464	5.740	0.000
4.0667	0.144	0.474	5.811	0.000
4.1333	0.145	0.484	5.882	0.000
4.2000	0.146	0.493	5.952	0.000
4.2667	0.147	0.503	6.021	0.000
4.3333	0.148	0.513	6.089	0.000
4.4000	0.149	0.523	6.156	0.000
4.4667	0.150	0.533	6.223	0.000
4.5333	0.151	0.543	6.289	0.000
4.6000	0.152	0.553	6.354	0.000
4.6667	0.153	0.563	6.418	0.000
4.7333	0.154	0.573	6.482	0.000
4.8000	0.155	0.584	6.545	0.000
4.8667	0.156	0.594	6.608	0.000
4.9333	0.157	0.605	6.669	0.000
5.0000	0.158	0.615	6.731	0.000
5.0667	0.159	0.626	7.409	0.000
5.1333	0.160	0.636	8.598	0.000
5.2000	0.161	0.647	10.11	0.000
5.2667	0.162	0.658	11.89	0.000
5.3333	0.163	0.669	13.89	0.000
5.4000	0.164	0.680	16.08	0.000
5.4667	0.165	0.691	18.42	0.000
5.5333	0.166	0.702	20.87	0.000
5.6000	0.167	0.713	23.43	0.000
5.6667	0.168	0.724	26.04	0.000
5.7333	0.169	0.735	28.67	0.000
5.8000	0.170	0.747	31.31	0.000
5.8667	0.171	0.758	33.90	0.000
5.9333	0.172	0.769	36.43	0.000
6.0000	0.173	0.781	38.85	0.000
6.0667	0.174	0.793	41.15	0.000

Pump

Width: 7.85 ft.
Length: 10 ft.
Depth: 13 ft.
Discharge Structure
Riser Height: 0 ft.
Riser Diameter: 0 in.
Element Flows To:
Outlet 1 Outlet 2
Flow Splitter 1

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.001802	0.000000	0.000	0.000
0.1444	0.001802	0.000260	0.371	0.000
0.2889	0.001802	0.000521	0.525	0.000
0.4333	0.001802	0.000781	0.643	0.000
0.5778	0.001802	0.001041	0.742	0.000
0.7222	0.001802	0.001302	0.830	0.000
0.8667	0.001802	0.001562	0.909	0.000
1.0111	0.001802	0.001822	0.982	0.000
1.1556	0.001802	0.002082	1.050	0.000
1.3000	0.001802	0.002343	1.113	0.000
1.4444	0.001802	0.002603	1.174	0.000
1.5889	0.001802	0.002863	1.231	0.000
1.7333	0.001802	0.003124	1.286	0.000
1.8778	0.001802	0.003384	1.338	0.000
2.0222	0.001802	0.003644	1.389	0.000
2.1667	0.001802	0.003905	1.438	0.000
2.3111	0.001802	0.004165	1.485	0.000
2.4556	0.001802	0.004425	1.530	0.000
2.6000	0.001802	0.004685	1.575	0.000
2.7444	0.001802	0.004946	1.618	0.000
2.8889	0.001802	0.005206	1.660	0.000
3.0333	0.001802	0.005466	1.701	0.000
3.1778	0.001802	0.005727	1.741	0.000
3.3222	0.001802	0.005987	1.780	0.000
3.4667	0.001802	0.006247	1.818	0.000
3.6111	0.001802	0.006508	1.856	0.000
3.7556	0.001802	0.006768	1.893	0.000
3.9000	0.001802	0.007028	1.929	0.000
4.0444	0.001802	0.007289	1.964	0.000
4.1889	0.001802	0.007549	1.999	0.000
4.3333	0.001802	0.007809	2.033	0.000
4.4778	0.001802	0.008069	2.067	0.000
4.6222	0.001802	0.008330	2.100	0.000
4.7667	0.001802	0.008590	2.132	0.000
4.9111	0.001802	0.008850	2.165	0.000
5.0556	0.001802	0.009111	2.196	0.000
5.2000	0.001802	0.009371	2.227	0.000
5.3444	0.001802	0.009631	2.258	0.000
5.4889	0.001802	0.009892	2.288	0.000
5.6333	0.001802	0.010152	2.318	0.000
5.7778	0.001802	0.010412	2.348	0.000
5.9222	0.001802	0.010673	2.377	0.000
6.0667	0.001802	0.010933	2.406	0.000

6.2111	0.001802	0.011193	2.434	0.000
6.3556	0.001802	0.011453	2.462	0.000
6.5000	0.001802	0.011714	2.490	0.000
6.6444	0.001802	0.011974	2.518	0.000
6.7889	0.001802	0.012234	2.545	0.000
6.9333	0.001802	0.012495	2.572	0.000
7.0778	0.001802	0.012755	2.599	0.000
7.2222	0.001802	0.013015	2.625	0.000
7.3667	0.001802	0.013276	2.651	0.000
7.5111	0.001802	0.013536	2.677	0.000
7.6556	0.001802	0.013796	2.703	0.000
7.8000	0.001802	0.014056	2.728	0.000
7.9444	0.001802	0.014317	2.753	0.000
8.0889	0.001802	0.014577	2.778	0.000
8.2333	0.001802	0.014837	2.803	0.000
8.3778	0.001802	0.015098	2.827	0.000
8.5222	0.001802	0.015358	2.851	0.000
8.6667	0.001802	0.015618	2.876	0.000
8.8111	0.001802	0.015879	2.899	0.000
8.9556	0.001802	0.016139	2.923	0.000
9.1000	0.001802	0.016399	2.947	0.000
9.2444	0.001802	0.016660	2.970	0.000
9.3889	0.001802	0.016920	2.993	0.000
9.5333	0.001802	0.017180	3.016	0.000
9.6778	0.001802	0.017440	3.039	0.000
9.8222	0.001802	0.017701	3.061	0.000
9.9667	0.001802	0.017961	3.084	0.000
10.111	0.001802	0.018221	3.361	0.000
10.256	0.001802	0.018482	3.818	0.000
10.400	0.001802	0.018742	4.035	0.000
10.544	0.001802	0.019002	4.205	0.000
10.689	0.001802	0.019263	4.355	0.000
10.833	0.001802	0.019523	4.493	0.000
10.978	0.001802	0.019783	4.621	0.000
11.122	0.001802	0.020043	4.741	0.000
11.267	0.001802	0.020304	4.854	0.000
11.411	0.001802	0.020564	4.963	0.000
11.556	0.001802	0.020824	5.066	0.000
11.700	0.001802	0.021085	5.166	0.000
11.844	0.001802	0.021345	5.263	0.000
11.989	0.001802	0.021605	5.356	0.000
12.133	0.001802	0.021866	5.447	0.000
12.278	0.001802	0.022126	5.535	0.000
12.422	0.001802	0.022386	5.621	0.000
12.567	0.001802	0.022647	5.705	0.000
12.711	0.001802	0.022907	5.787	0.000
12.856	0.001802	0.023167	5.868	0.000
13.000	0.001802	0.023427	5.946	0.000
13.144	0.001802	0.023688	6.024	0.000
13.289	0.000000	0.000000	6.099	0.000

Bioretention Basin 2

Bottom Length:	125.00 ft.
Bottom Width:	10.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	Amended 5 in/hr
Material thickness of second layer:	2
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Underdrain used	
Underdrain Diameter (feet):	1
Orifice Diameter (in.):	12
Offset (in.):	0
Flow Through Underdrain (ac-ft.):	31.799
Total Outflow (ac-ft.):	34.282
Percent Through Underdrain:	92.76

Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 8 in.
Element Flows To:
Outlet 1 Outlet 2
Pump

In Ground Planter Box Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0287	0.0000	0.0000	0.0000
0.0604	0.0287	0.0007	0.0000	0.0000
0.1209	0.0287	0.0015	0.0000	0.0000
0.1813	0.0287	0.0022	0.0000	0.0000
0.2418	0.0287	0.0029	0.0000	0.0000
0.3022	0.0287	0.0036	0.0000	0.0000
0.3626	0.0287	0.0044	0.0000	0.0000
0.4231	0.0287	0.0051	0.0000	0.0000
0.4835	0.0287	0.0058	0.0000	0.0000
0.5440	0.0287	0.0066	0.0000	0.0000
0.6044	0.0287	0.0073	0.0000	0.0000
0.6648	0.0287	0.0080	0.0000	0.0000
0.7253	0.0287	0.0087	0.0000	0.0000
0.7857	0.0287	0.0095	0.0000	0.0000
0.8462	0.0287	0.0102	0.0000	0.0000
0.9066	0.0287	0.0109	0.0000	0.0000
0.9670	0.0287	0.0117	0.0000	0.0000
1.0275	0.0287	0.0124	0.0000	0.0000
1.0879	0.0287	0.0131	0.0000	0.0000
1.1484	0.0287	0.0138	0.0000	0.0000
1.2088	0.0287	0.0146	0.0000	0.0000
1.2692	0.0287	0.0153	0.0000	0.0000
1.3297	0.0287	0.0160	0.0000	0.0000
1.3901	0.0287	0.0168	0.0000	0.0000
1.4505	0.0287	0.0175	0.0000	0.0000
1.5110	0.0287	0.0182	0.0000	0.0000
1.5714	0.0287	0.0189	0.0000	0.0000
1.6319	0.0287	0.0196	0.0000	0.0000
1.6923	0.0287	0.0204	0.0000	0.0000
1.7527	0.0287	0.0211	0.0000	0.0000
1.8132	0.0287	0.0218	0.0000	0.0000

1.8736	0.0287	0.0225	0.0000	0.0000
1.9341	0.0287	0.0232	0.0000	0.0000
1.9945	0.0287	0.0240	0.0000	0.0000
2.0549	0.0287	0.0247	0.0000	0.0000
2.1154	0.0287	0.0254	0.0000	0.0000
2.1758	0.0287	0.0261	0.0000	0.0000
2.2363	0.0287	0.0268	0.0000	0.0000
2.2967	0.0287	0.0276	0.0000	0.0000
2.3571	0.0287	0.0283	0.0000	0.0000
2.4176	0.0287	0.0290	0.0000	0.0000
2.4780	0.0287	0.0297	0.0000	0.0000
2.5385	0.0287	0.0304	0.0000	0.0000
2.5989	0.0287	0.0312	0.0000	0.0000
2.6593	0.0287	0.0319	0.0000	0.0000
2.7198	0.0287	0.0326	0.0000	0.0000
2.7802	0.0287	0.0333	0.0000	0.0000
2.8407	0.0287	0.0340	0.0000	0.0000
2.9011	0.0287	0.0348	0.0000	0.0000
2.9615	0.0287	0.0355	0.0000	0.0000
3.0220	0.0287	0.0362	0.0000	0.0000
3.0824	0.0287	0.0369	0.0000	0.0000
3.1429	0.0287	0.0376	0.0000	0.0000
3.2033	0.0287	0.0384	0.0000	0.0000
3.2637	0.0287	0.0391	0.0000	0.0000
3.3242	0.0287	0.0398	0.0000	0.0000
3.3846	0.0287	0.0405	0.0000	0.0000
3.4451	0.0287	0.0412	0.0000	0.0000
3.5000	0.0287	0.0419	0.0000	0.0000

In Ground Planter Box Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.5000	0.0287	0.0419	0.0000	0.1481	0.0000
3.5604	0.0287	0.0436	0.0000	0.1481	0.0000
3.6209	0.0287	0.0454	0.0000	0.1481	0.0000
3.6813	0.0287	0.0471	0.0004	0.1481	0.0000
3.7418	0.0287	0.0488	0.0009	0.1481	0.0000
3.8022	0.0287	0.0506	0.0017	0.1481	0.0000
3.8626	0.0287	0.0523	0.0029	0.1481	0.0000
3.9231	0.0287	0.0540	0.0044	0.1481	0.0000
3.9835	0.0287	0.0558	0.0046	0.1481	0.0000
4.0440	0.0287	0.0575	0.0064	0.1481	0.0000
4.1044	0.0287	0.0592	0.0089	0.1481	0.0000
4.1648	0.0287	0.0610	0.0119	0.1481	0.0000
4.2253	0.0287	0.0627	0.0155	0.1481	0.0000
4.2857	0.0287	0.0644	0.0188	0.1481	0.0000
4.3462	0.0287	0.0662	0.0196	0.1481	0.0000
4.4066	0.0287	0.0679	0.0243	0.1481	0.0000
4.4670	0.0287	0.0696	0.0297	0.1481	0.0000
4.5275	0.0287	0.0714	0.0357	0.1481	0.0000
4.5879	0.0287	0.0731	0.0423	0.1481	0.0000
4.6484	0.0287	0.0748	0.0459	0.1481	0.0000
4.7088	0.0287	0.0766	0.0497	0.1481	0.0000
4.7692	0.0287	0.0783	0.0578	0.1481	0.0000
4.8297	0.0287	0.0800	0.0666	0.1481	0.0000
4.8901	0.0287	0.0818	0.0762	0.1481	0.0000
4.9505	0.0287	0.0835	0.0866	0.1481	0.0000
5.0110	0.0287	0.0852	0.0884	0.1481	0.0000
5.0714	0.0287	0.0870	0.0978	0.1481	0.0000

5.1319	0.0287	0.0887	0.1098	0.1481	0.0000
5.1923	0.0287	0.0905	0.1226	0.1481	0.0000
5.2527	0.0287	0.0922	0.1363	0.1481	0.0000
5.3132	0.0287	0.0939	0.1481	0.1481	0.0000
5.3736	0.0287	0.0957	0.1481	0.1481	0.0000
5.4341	0.0287	0.0974	0.1481	0.1481	0.0000
5.4945	0.0287	0.0991	0.1481	0.1481	0.0000
5.5000	0.0287	0.0993	0.1481	0.1481	0.0000

Bioretenti Surface 2

Element Flows To:

Outlet 1	Outlet 2
Pump	Bioretention Basin 2

Flow Splitter 1

Bottom Length: 10.00 ft.
Bottom Length: 10.00 ft.
Depth: 10 ft.
Side slope 1: 0 To 1
Side slope 2: 0 To 1
Side slope 3: 0 To 1
Side slope 4: 0 To 1
Control Structure Splitter Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Primary(cfs)	Secondary(cfs)
0.000	0.002	0.000	0.000	0.000
0.111	0.002	0.000	0.144	0.000
0.222	0.002	0.000	0.204	0.000
0.333	0.002	0.000	0.250	0.000
0.444	0.002	0.001	0.289	0.000
0.555	0.002	0.001	0.323	0.000
0.666	0.002	0.001	0.354	0.000
0.777	0.002	0.001	0.382	0.000
0.888	0.002	0.002	0.409	0.000
1.000	0.002	0.002	0.434	0.000
1.111	0.002	0.002	0.457	0.000
1.222	0.002	0.002	0.480	0.000
1.333	0.002	0.003	0.501	0.000
1.444	0.002	0.003	0.521	0.000
1.555	0.002	0.003	0.541	0.000
1.666	0.002	0.003	0.560	0.000
1.777	0.002	0.004	0.578	0.000
1.888	0.002	0.004	0.596	0.000
2.000	0.002	0.004	0.614	0.000
2.111	0.002	0.004	0.630	0.000
2.222	0.002	0.005	0.647	0.000
2.333	0.002	0.005	0.663	0.000
2.444	0.002	0.005	0.678	0.000
2.555	0.002	0.005	0.694	0.000
2.666	0.002	0.006	0.709	0.000
2.777	0.002	0.006	0.723	0.000
2.888	0.002	0.006	0.738	0.000
3.000	0.002	0.006	0.752	0.000
3.111	0.002	0.007	0.765	0.000
3.222	0.002	0.007	0.779	0.000
3.333	0.002	0.007	0.792	0.000
3.444	0.002	0.007	0.805	0.000
3.555	0.002	0.008	0.818	0.000
3.666	0.002	0.008	0.831	0.000
3.777	0.002	0.008	0.843	0.000
3.888	0.002	0.008	0.856	0.000
4.000	0.002	0.009	0.868	0.000
4.111	0.002	0.009	0.880	0.000
4.222	0.002	0.009	0.892	0.000
4.333	0.002	0.009	0.903	0.000
4.444	0.002	0.010	0.915	0.000
4.555	0.002	0.010	0.926	0.000
4.666	0.002	0.010	0.938	0.000
4.777	0.002	0.011	0.949	0.000
4.888	0.002	0.011	0.960	0.000
5.000	0.002	0.011	0.970	0.000
5.111	0.002	0.011	0.981	1.571

5.222	0.002	0.012	0.992	4.439
5.333	0.002	0.012	1.002	8.137
5.444	0.002	0.012	1.013	12.47
5.555	0.002	0.012	1.023	17.31
5.666	0.002	0.013	1.033	22.51
5.777	0.002	0.013	1.043	27.94
5.888	0.002	0.013	1.053	33.47
6.000	0.002	0.013	1.063	38.96
6.111	0.002	0.014	1.258	44.27
6.222	0.002	0.014	1.452	49.28
6.333	0.002	0.014	1.547	53.87
6.444	0.002	0.014	1.627	57.95
6.555	0.002	0.015	1.698	61.47
6.666	0.002	0.015	1.764	64.41
6.777	0.002	0.015	1.824	66.82
6.888	0.002	0.015	1.882	68.79
7.000	0.002	0.016	1.936	70.50
7.111	0.002	0.016	1.987	73.22
7.222	0.002	0.016	2.037	75.12
7.333	0.002	0.016	2.085	76.97
7.444	0.002	0.017	2.131	78.79
7.555	0.002	0.017	2.175	80.56
7.666	0.002	0.017	2.218	82.29
7.777	0.002	0.017	2.260	83.99
7.888	0.002	0.018	2.301	85.65
8.000	0.002	0.018	2.341	87.28
8.111	0.002	0.018	2.380	88.88
8.222	0.002	0.018	2.418	90.46
8.333	0.002	0.019	2.456	92.00
8.444	0.002	0.019	2.492	93.52
8.555	0.002	0.019	2.528	95.02
8.666	0.002	0.019	2.564	96.49
8.777	0.002	0.020	2.598	97.94
8.888	0.002	0.020	2.632	99.37
9.000	0.002	0.020	2.666	100.7
9.111	0.002	0.020	2.699	102.1
9.222	0.002	0.021	2.732	103.5
9.333	0.002	0.021	2.764	104.9
9.444	0.002	0.021	2.795	106.2
9.555	0.002	0.021	2.826	107.5
9.666	0.002	0.022	2.857	108.8
9.777	0.002	0.022	2.888	110.1
9.888	0.002	0.022	2.918	111.4
10.00	0.002	0.023	2.947	112.6
10.11	0.002	0.023	2.977	113.9

Discharge Structure
Riser Height: 6 ft.
Riser Diameter: 6 in.
Orifice 1 Diameter: 4 in. Elevation:0 ft.
Element Flows To:

Outlet 1	Outlet 2
STREET	DETENTION BASIN

STREET

Bottom Length:	2.00 ft.	
Bottom Width:	2.00 ft.	
Depth:	2 ft.	
Volume at riser head:	0.0004 acre-feet.	
Infiltration On		
Infiltration rate:	0.75	
Infiltration safety factor:	1	
Wetted surface area On		
Total Volume Infiltrated (ac-ft.):		0
Total Volume Through Riser (ac-ft.):		0
Total Volume Through Facility (ac-ft.):		0
Percent Infiltrated:		0
Total Precip Applied to Facility:		0.003
Total Evap From Facility:		0.001
Side slope 1:	2 To 1	
Side slope 2:	2 To 1	
Side slope 3:	2 To 1	
Side slope 4:	2 To 1	
Discharge Structure		
Riser Height:	1 ft.	
Riser Diameter:	48 in.	
Notch Type:	Rectangular	
Notch Width:	3.000 ft.	
Notch Height:	0.250 ft.	
Orifice 1 Diameter:	48 in.	Elevation:0 ft.
Element Flows To:		
Outlet 1	Outlet 2	

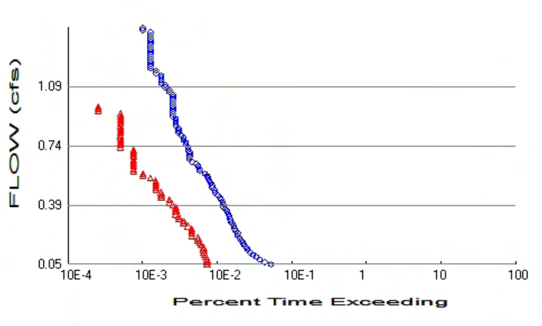
Pond Hydraulic Table

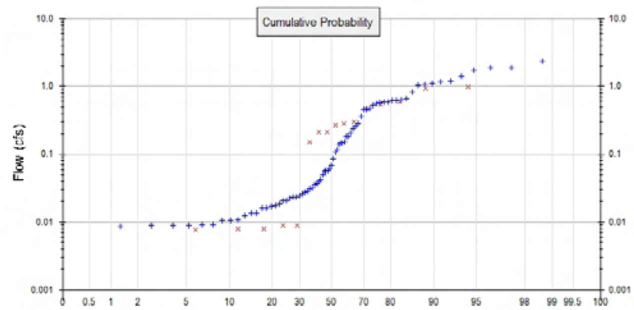
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.000092	0.000000	0.000	0.000
0.0222	0.000100	0.000002	9.320	0.000
0.0444	0.000109	0.000004	13.18	0.000
0.0667	0.000118	0.000007	16.14	0.000
0.0889	0.000127	0.000010	18.64	0.000
0.1111	0.000137	0.000013	20.84	0.000
0.1333	0.000147	0.000016	22.83	0.000
0.1556	0.000158	0.000019	24.65	0.000
0.1778	0.000169	0.000023	26.36	0.000
0.2000	0.000180	0.000027	27.96	0.000
0.2222	0.000192	0.000031	29.47	0.000
0.2444	0.000204	0.000035	30.91	0.000
0.2667	0.000216	0.000040	32.28	0.000
0.2889	0.000229	0.000045	33.60	0.000
0.3111	0.000242	0.000050	34.87	0.000
0.3333	0.000255	0.000056	36.09	0.000
0.3556	0.000269	0.000061	37.28	0.000
0.3778	0.000283	0.000068	38.42	0.000
0.4000	0.000298	0.000074	39.54	0.000
0.4222	0.000312	0.000081	40.62	0.000
0.4444	0.000328	0.000088	41.68	0.000
0.4667	0.000343	0.000095	42.71	0.000
0.4889	0.000359	0.000103	43.71	0.000
0.5111	0.000376	0.000111	44.69	0.000

0.5333	0.000392	0.000120	45.66	0.000
0.5556	0.000409	0.000129	46.60	0.000
0.5778	0.000427	0.000138	47.52	0.000
0.6000	0.000444	0.000148	48.43	0.000
0.6222	0.000463	0.000158	49.31	0.000
0.6444	0.000481	0.000168	50.19	0.000
0.6667	0.000500	0.000179	51.05	0.000
0.6889	0.000519	0.000190	51.89	0.000
0.7111	0.000539	0.000202	52.72	0.000
0.7333	0.000559	0.000214	53.54	0.000
0.7556	0.000579	0.000227	54.35	0.000
0.7778	0.000600	0.000240	55.18	0.000
0.8000	0.000621	0.000254	56.03	0.000
0.8222	0.000642	0.000268	56.88	0.000
0.8444	0.000664	0.000282	57.74	0.000
0.8667	0.000686	0.000297	58.60	0.000
0.8889	0.000709	0.000313	59.46	0.000
0.9111	0.000731	0.000329	60.32	0.000
0.9333	0.000755	0.000345	61.18	0.000
0.9556	0.000778	0.000362	62.04	0.000
0.9778	0.000802	0.000380	62.91	0.000
1.0000	0.000826	0.000398	63.77	0.000
1.0222	0.000851	0.000417	64.60	0.000
1.0444	0.000876	0.000436	65.54	0.000
1.0667	0.000902	0.000456	66.55	0.000
1.0889	0.000927	0.000476	67.61	0.000
1.1111	0.000953	0.000497	68.72	0.000
1.1333	0.000980	0.000518	69.87	0.000
1.1556	0.001007	0.000540	71.06	0.000
1.1778	0.001034	0.000563	72.28	0.000
1.2000	0.001062	0.000586	73.53	0.000
1.2222	0.001089	0.000610	74.81	0.000
1.2444	0.001118	0.000635	76.11	0.000
1.2667	0.001146	0.000660	77.44	0.000
1.2889	0.001175	0.000686	78.80	0.000
1.3111	0.001205	0.000712	80.18	0.000
1.3333	0.001235	0.000739	81.58	0.000
1.3556	0.001265	0.000767	83.00	0.001
1.3778	0.001295	0.000795	84.44	0.001
1.4000	0.001326	0.000825	85.90	0.001
1.4222	0.001357	0.000854	87.37	0.001
1.4444	0.001389	0.000885	88.86	0.001
1.4667	0.001421	0.000916	90.37	0.001
1.4889	0.001453	0.000948	91.89	0.001
1.5111	0.001486	0.000981	93.43	0.001
1.5333	0.001519	0.001014	94.97	0.001
1.5556	0.001552	0.001048	96.53	0.001
1.5778	0.001586	0.001083	98.10	0.001
1.6000	0.001620	0.001119	99.68	0.001
1.6222	0.001654	0.001155	101.2	0.001
1.6444	0.001689	0.001192	102.8	0.001
1.6667	0.001724	0.001230	104.4	0.001
1.6889	0.001760	0.001269	106.0	0.001
1.7111	0.001796	0.001308	107.7	0.001
1.7333	0.001832	0.001349	109.3	0.001
1.7556	0.001869	0.001390	110.9	0.001
1.7778	0.001906	0.001432	112.5	0.001
1.8000	0.001943	0.001474	114.1	0.001

1.8222	0.001981	0.001518	115.8	0.001
1.8444	0.002019	0.001562	117.4	0.001
1.8667	0.002057	0.001608	119.0	0.001
1.8889	0.002096	0.001654	120.6	0.001
1.9111	0.002135	0.001701	122.2	0.001
1.9333	0.002175	0.001749	123.8	0.001
1.9556	0.002215	0.001798	125.4	0.001
1.9778	0.002255	0.001847	127.0	0.001
2.0000	0.002296	0.001898	128.6	0.001
2.0222	0.002337	0.001949	130.2	0.001

Analysis Results
POC 1





+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 3.44
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.27
Total Impervious Area: 2.17

Flow Frequency Method: Weibull

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.456503
5 year	1.063419
10 year	1.438508
25 year	1.879364

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0
5 year	0.213058
10 year	0.480389
25 year	0.831312

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0457	208	29	13	Pass
0.0597	171	29	16	Pass
0.0738	147	29	19	Pass
0.0879	132	28	21	Pass
0.1019	119	27	22	Pass
0.1160	110	26	23	Pass
0.1301	102	26	25	Pass
0.1441	98	26	26	Pass
0.1582	90	24	26	Pass
0.1723	87	23	26	Pass
0.1863	83	22	26	Pass
0.2004	79	22	27	Pass
0.2145	75	18	24	Pass
0.2286	74	18	24	Pass
0.2426	70	18	25	Pass
0.2567	68	18	26	Pass
0.2708	66	16	24	Pass
0.2848	63	14	22	Pass
0.2989	60	14	23	Pass
0.3130	59	12	20	Pass
0.3270	58	12	20	Pass
0.3411	56	11	19	Pass
0.3552	54	11	20	Pass
0.3692	51	11	21	Pass
0.3833	48	11	22	Pass
0.3974	48	10	20	Pass
0.4115	47	9	19	Pass
0.4255	45	9	20	Pass
0.4396	43	7	16	Pass
0.4537	40	7	17	Pass
0.4677	37	7	18	Pass
0.4818	36	6	16	Pass
0.4959	34	6	17	Pass
0.5099	34	6	17	Pass
0.5240	33	6	18	Pass
0.5381	31	6	19	Pass
0.5521	30	5	16	Pass
0.5662	29	4	13	Pass
0.5803	27	4	14	Pass
0.5944	23	3	13	Pass
0.6084	23	3	13	Pass
0.6225	22	3	13	Pass
0.6366	21	3	14	Pass
0.6506	18	3	16	Pass
0.6647	17	3	17	Pass
0.6788	17	3	17	Pass
0.6928	17	3	17	Pass
0.7069	17	3	17	Pass
0.7210	16	3	18	Pass
0.7350	16	2	12	Pass
0.7491	15	2	13	Pass
0.7632	15	2	13	Pass
0.7773	14	2	14	Pass

0.7913	14	2	14	Pass
0.8054	13	2	15	Pass
0.8195	12	2	16	Pass
0.8335	12	2	16	Pass
0.8476	12	2	16	Pass
0.8617	11	2	18	Pass
0.8757	11	2	18	Pass
0.8898	11	2	18	Pass
0.9039	11	2	18	Pass
0.9179	10	2	20	Pass
0.9320	10	2	20	Pass
0.9461	10	1	10	Pass
0.9602	10	1	10	Pass
0.9742	10	1	10	Pass
0.9883	10	0	0	Pass
1.0024	10	0	0	Pass
1.0164	10	0	0	Pass
1.0305	10	0	0	Pass
1.0446	10	0	0	Pass
1.0586	9	0	0	Pass
1.0727	9	0	0	Pass
1.0868	8	0	0	Pass
1.1008	8	0	0	Pass
1.1149	7	0	0	Pass
1.1290	7	0	0	Pass
1.1431	7	0	0	Pass
1.1571	7	0	0	Pass
1.1712	6	0	0	Pass
1.1853	6	0	0	Pass
1.1993	5	0	0	Pass
1.2134	5	0	0	Pass
1.2275	5	0	0	Pass
1.2415	5	0	0	Pass
1.2556	5	0	0	Pass
1.2697	5	0	0	Pass
1.2837	5	0	0	Pass
1.2978	5	0	0	Pass
1.3119	5	0	0	Pass
1.3260	5	0	0	Pass
1.3400	5	0	0	Pass
1.3541	5	0	0	Pass
1.3682	5	0	0	Pass
1.3822	5	0	0	Pass
1.3963	5	0	0	Pass
1.4104	5	0	0	Pass
1.4244	4	0	0	Pass
1.4385	4	0	0	Pass

Water Quality

Drawdown Time Results

Pond: STREET

Days	Stage(feet)	Percent of Total Run Time
1	N/A	N/A
2	N/A	N/A
3	N/A	N/A
4	N/A	N/A
5	N/A	N/A

Maximum Stage: 0.002 Drawdown Time: Less than 1 day

Pond: DETENTION BASIN

Days	Stage(feet)	Percent of Total Run Time
1	0.225	0.0380
2	0.333	0.0218
3	N/A	N/A
4	N/A	N/A
5	N/A	N/A

Maximum Stage: 0.491 Drawdown Time: 02 14:37:30

POC 2

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 3

POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run.

POC 4

POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Model Default Modifications

Total of 0 changes have been made.

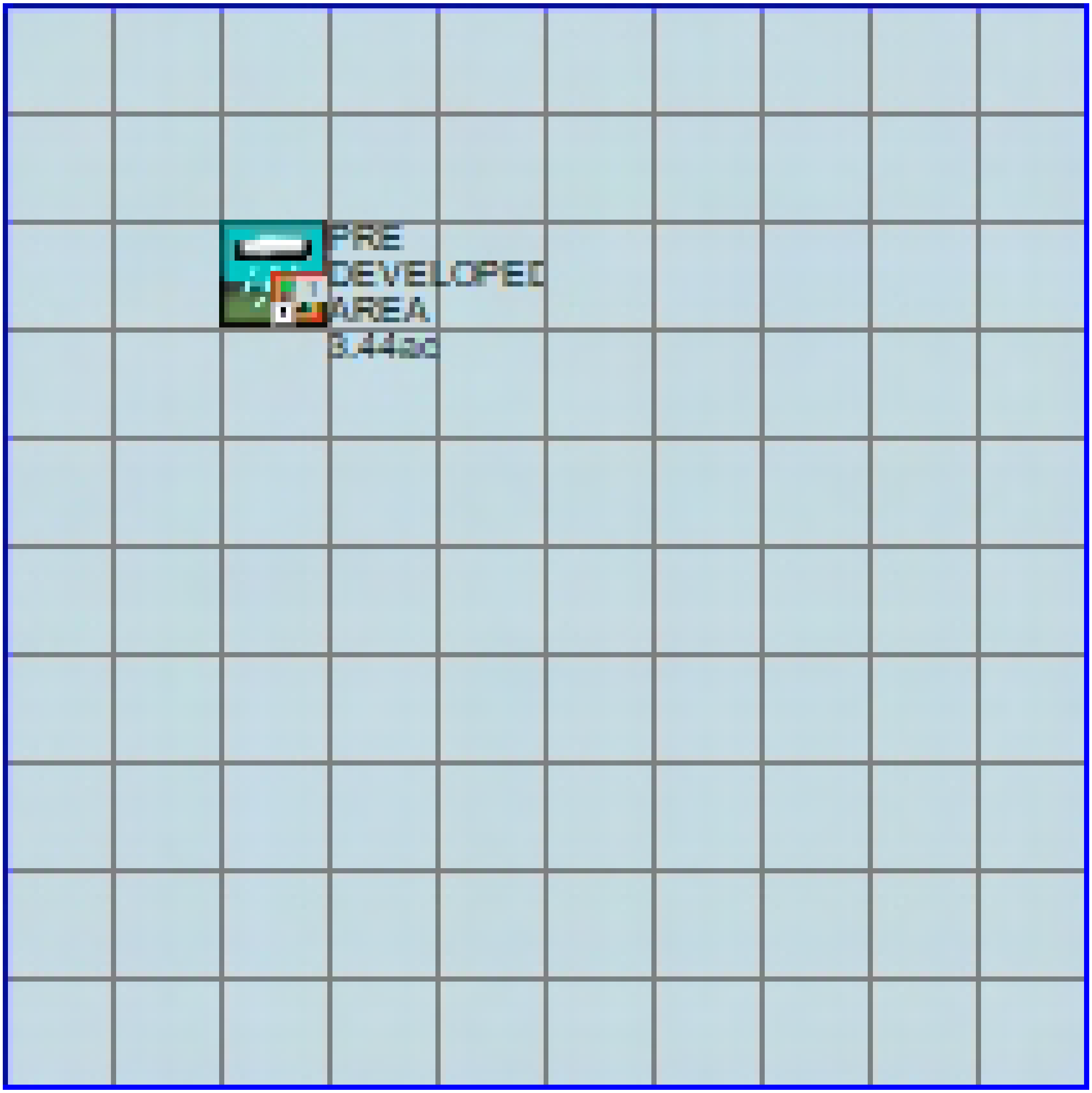
PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1959 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   OCEANSIDE SENIOR LIVING BASIN 2017-10-09 w 1POC.wdm
MESSU      25   MitOCEANSIDE SENIOR LIVING BASIN 2017-10-09 w 1POC.MES
           27   MitOCEANSIDE SENIOR LIVING BASIN 2017-10-09 w 1POC.L61
           28   MitOCEANSIDE SENIOR LIVING BASIN 2017-10-09 w 1POC.L62
           30   POCOCEANSIDE SENIOR LIVING BASIN 2017-10-09 w 1POC1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      19
      IMPLND       1
      RCHRES       1
      RCHRES       2
      RCHRES       3
      RCHRES       4
      RCHRES       5
      RCHRES       6
      RCHRES       7
      RCHRES       8
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        DETENTION BASIN             MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                            User  t-series Engl Metr ***
                                             in  out           ***
   19      C,NatVeg,Flat          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
```

```
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   19         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > **************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   19         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   19         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   19              0       4.8      0.05       200      0.05       2.5     0.915
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   19              0         0         2         2         0      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                               ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   19              0       0.6       0.2       1.5       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   19       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   19       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   19              0         0      0.01         0       0.4      0.01         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                       in  out          ***
    1      IMPERVIOUS-FLAT        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
```

```
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    1
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05      0.05       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                   <--Area-->     <-Target->   MBLK   ***
<Name>   #                   <-factor->     <Name>   #   Tbl#   ***
AREA 2***
PERLND  19                         0.87     RCHRES   1      2
PERLND  19                         0.87     RCHRES   1      3
IMPLND   1                         1.21     RCHRES   1      5
AREA 1***
PERLND  19                          0.4     RCHRES   3      2
PERLND  19                          0.4     RCHRES   3      3
IMPLND   1                         0.96     RCHRES   3      5

******Routing******
RCHRES   2                            1     RCHRES   5      6
RCHRES   1                            1     RCHRES   5      7
RCHRES   1                            1     RCHRES   2      8
RCHRES   5                            1     RCHRES   6      6
RCHRES   4                            1     RCHRES   5      6
RCHRES   3                            1     RCHRES   5      7
RCHRES   3                            1     RCHRES   4      8
RCHRES   6                            1     RCHRES   8      7
RCHRES   6                                  COPY     1     17
RCHRES   6                            1     RCHRES   7      8
RCHRES   6                                  COPY     1     18
RCHRES   7                            1     COPY   501     16
RCHRES   8                            1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
```

```
  RCHRES       Name        Nexits   Unit Systems   Printer                    ***
  # -  #<------------------><---> User T-series  Engl Metr LKFG               ***
                                         in  out                              ***
  1     Bioretenti Surfa-020    3    1    1    1   28    0    1
  2     Bioretention Bas-019    1    1    1    1   28    0    1
  3     Bioretenti Surfa-045    3    1    1    1   28    0    1
  4     Bioretention Bas-044    1    1    1    1   28    0    1
  5     Pump                    1    1    1    1   28    0    1
  6     Flow Splitter  1-047    2    1    1    1   28    0    1
  7     DETENTION BASIN         1    1    1    1   28    0    1
  8     STREET                  2    1    1    1   28    0    1
END GEN-INFO
*** Section RCHRES***

ACTIVITY
  <PLS > ************* Active Sections *****************************
  # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  1         1    0    0    0    0    0    0    0    0    0
  2         1    0    0    0    0    0    0    0    0    0
  3         1    0    0    0    0    0    0    0    0    0
  4         1    0    0    0    0    0    0    0    0    0
  5         1    0    0    0    0    0    0    0    0    0
  6         1    0    0    0    0    0    0    0    0    0
  7         1    0    0    0    0    0    0    0    0    0
  8         1    0    0    0    0    0    0    0    0    0
END ACTIVITY

PRINT-INFO
  <PLS > ***************** Print-flags ****************** PIVL  PYR
  # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR   *********
  1         4    0    0    0    0    0    0    0    0    0    1    9
  2         4    0    0    0    0    0    0    0    0    0    1    9
  3         4    0    0    0    0    0    0    0    0    0    1    9
  4         4    0    0    0    0    0    0    0    0    0    1    9
  5         4    0    0    0    0    0    0    0    0    0    1    9
  6         4    0    0    0    0    0    0    0    0    0    1    9
  7         4    0    0    0    0    0    0    0    0    0    1    9
  8         4    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO

HYDR-PARM1
  RCHRES  Flags for each HYDR Section                                         ***
  # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
          FG FG FG FG  possible  exit  *** possible  exit      possible  exit
           *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  1        0  1  0  0    4  5  6  0  0       0  0  0  0  0       2  2  2  2  2
  2        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  3        0  1  0  0    4  5  6  0  0       0  0  0  0  0       2  2  2  2  2
  4        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  5        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  6        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  7        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  8        0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
END HYDR-PARM1

HYDR-PARM2
  # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50          ***
<------><--------><--------><--------><--------><--------><-------->          ***
  1             1      0.01       0.0       0.0       0.5       0.0
  2             2      0.03       0.0       0.0       0.5       0.0
  3             3      0.01       0.0       0.0       0.5       0.0
  4             4      0.02       0.0       0.0       0.5       0.0
  5             5      0.01       0.0       0.0       0.5       0.0
  6             6      0.01       0.0       0.0       0.5       0.0
  7             7      0.01       0.0       0.0       0.5       0.0
  8             8      0.01       0.0       0.0       0.5       0.0
END HYDR-PARM2
HYDR-INIT
  RCHRES  Initial conditions for each HYDR section                            ***
  # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
```

```
        *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1          0          4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2          0          4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3          0          4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    4          0          4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    5          0          4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    6          0          4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    7          0          4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    8          0          4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE       2
   59    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)    (cfs)  (ft/sec)    (Minutes)***
  0.000000  0.038797  0.000000  0.000000
  0.060440  0.038797  0.000985  0.000000
  0.120879  0.038797  0.001970  0.000000
  0.181319  0.038797  0.002955  0.000487
  0.241758  0.038797  0.003939  0.001171
  0.302198  0.038797  0.004924  0.002273
  0.362637  0.038797  0.005909  0.003860
  0.423077  0.038797  0.006894  0.005992
  0.483516  0.038797  0.007879  0.006158
  0.543956  0.038797  0.008864  0.008720
  0.604396  0.038797  0.009848  0.012092
  0.664835  0.038797  0.010833  0.016155
  0.725275  0.038797  0.011818  0.020949
  0.785714  0.038797  0.012803  0.025467
  0.846154  0.038797  0.013788  0.026515
  0.906593  0.038797  0.014773  0.032889
  0.967033  0.038797  0.015758  0.040109
  1.027473  0.038797  0.016742  0.048209
  1.087912  0.038797  0.017727  0.057222
  1.148352  0.038797  0.018712  0.062107
  1.208791  0.038797  0.019697  0.067179
  1.269231  0.038797  0.020682  0.078112
  1.329670  0.038797  0.021667  0.090050
  1.390110  0.038797  0.022652  0.103022
  1.450549  0.038797  0.023636  0.117055
  1.510989  0.038797  0.024609  0.119524
  1.571429  0.038797  0.025583  0.132177
  1.631868  0.038797  0.026556  0.148411
  1.692308  0.038797  0.027529  0.165780
  1.752747  0.038797  0.028502  0.184299
  1.813187  0.038797  0.029475  0.200222
  1.873626  0.038797  0.030448  0.200222
  1.934066  0.038797  0.031421  0.200222
  1.994505  0.038797  0.032394  0.200222
  2.054945  0.038797  0.033368  0.200222
  2.115385  0.038797  0.034341  0.200222
  2.175824  0.038797  0.035314  0.200222
  2.236264  0.038797  0.036287  0.200222
  2.296703  0.038797  0.037260  0.200222
  2.357143  0.038797  0.038233  0.200222
  2.417582  0.038797  0.039206  0.200222
  2.478022  0.038797  0.040179  0.200222
  2.538462  0.038797  0.041153  0.200222
  2.598901  0.038797  0.042126  0.200222
  2.659341  0.038797  0.043099  0.200222
  2.719780  0.038797  0.044072  0.200222
  2.780220  0.038797  0.045045  0.200222
  2.840659  0.038797  0.046018  0.200222
  2.901099  0.038797  0.046991  0.200222
  2.961538  0.038797  0.047964  0.200222
```

```
  3.021978  0.038797  0.048938  0.200222
  3.082418  0.038797  0.049911  0.200222
  3.142857  0.038797  0.050884  0.200222
  3.203297  0.038797  0.051857  0.200222
  3.263736  0.038797  0.052830  0.200222
  3.324176  0.038797  0.053803  0.200222
  3.384615  0.038797  0.054776  0.200222
  3.445055  0.038797  0.055749  0.200222
  3.500000  0.038797  0.113268  0.200222
  END FTABLE  2
  FTABLE      1
   35    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.038797  0.000000  0.000000  0.000000  0.000000
  0.060440  0.038797  0.002345  0.000000  0.200222  0.000000
  0.120879  0.038797  0.004690  0.000000  0.200222  0.000000
  0.181319  0.038797  0.007035  0.000000  0.200222  0.000000
  0.241758  0.038797  0.009380  0.000000  0.200222  0.000000
  0.302198  0.038797  0.011724  0.000000  0.200222  0.000000
  0.362637  0.038797  0.014069  0.000000  0.200222  0.000000
  0.423077  0.038797  0.016414  0.000000  0.200222  0.000000
  0.483516  0.038797  0.018759  0.000000  0.200222  0.000000
  0.543956  0.038797  0.021104  0.000000  0.200222  0.000000
  0.604396  0.038797  0.023449  0.000000  0.200222  0.000000
  0.664835  0.038797  0.025794  0.000000  0.200222  0.000000
  0.725275  0.038797  0.028139  0.000000  0.200222  0.000000
  0.785714  0.038797  0.030483  0.000000  0.200222  0.000000
  0.846154  0.038797  0.032828  0.000000  0.200222  0.000000
  0.906593  0.038797  0.035173  0.000000  0.200222  0.000000
  0.967033  0.038797  0.037518  0.000000  0.200222  0.000000
  1.027473  0.038797  0.039863  0.032183  0.200222  0.000000
  1.087912  0.038797  0.042208  0.181987  0.200222  0.000000
  1.148352  0.038797  0.044553  0.380280  0.200222  0.000000
  1.208791  0.038797  0.046898  0.573677  0.200222  0.000000
  1.269231  0.038797  0.049242  0.715919  0.200222  0.000000
  1.329670  0.038797  0.051587  0.795819  0.200222  0.000000
  1.390110  0.038797  0.053932  0.874320  0.200222  0.000000
  1.450549  0.038797  0.056277  0.939611  0.200222  0.000000
  1.510989  0.038797  0.058622  1.000651  0.200222  0.000000
  1.571429  0.038797  0.060967  1.058176  0.200222  0.000000
  1.631868  0.038797  0.063312  1.112731  0.200222  0.000000
  1.692308  0.038797  0.065657  1.164734  0.200222  0.000000
  1.752747  0.038797  0.068001  1.214511  0.200222  0.000000
  1.813187  0.038797  0.070346  1.262328  0.200222  0.000000
  1.873626  0.038797  0.072691  1.308398  0.200222  0.000000
  1.934066  0.038797  0.075036  1.352900  0.200222  0.000000
  1.994505  0.038797  0.077381  1.395985  0.200222  0.000000
  2.000000  0.038797  0.077594  1.437778  0.200222  0.000000
  END FTABLE  1
  FTABLE      7
   91    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.091116  0.000000  0.000000
  0.066667  0.091889  0.006100  0.004484
  0.133333  0.092665  0.012252  0.006342
  0.200000  0.093444  0.018456  0.007767
  0.266667  0.094227  0.024711  0.008969
  0.333333  0.095013  0.031019  0.010027
  0.400000  0.095803  0.037380  0.010984
  0.466667  0.096595  0.043793  0.011864
  0.533333  0.097391  0.050259  0.329770
  0.600000  0.098190  0.056779  0.562663
  0.666667  0.098992  0.063351  0.723208
  0.733333  0.099798  0.069978  0.853805
  0.800000  0.100607  0.076658  0.966794
  0.866667  0.101419  0.083392  1.067826
```

0.933333	0.102235	0.090181	1.160051
1.000000	0.103053	0.097024	1.245439
1.066667	0.103875	0.103921	1.325319
1.133333	0.104700	0.110874	1.400638
1.200000	0.105529	0.117881	1.472099
1.266667	0.106361	0.124944	1.540241
1.333333	0.107196	0.132063	1.605488
1.400000	0.108034	0.139237	1.668181
1.466667	0.108876	0.146467	1.728597
1.533333	0.109720	0.153754	1.786970
1.600000	0.110568	0.161097	1.843493
1.666667	0.111420	0.168497	1.898332
1.733333	0.112274	0.175953	1.951629
1.800000	0.113132	0.183467	2.003507
1.866667	0.113993	0.191037	2.054074
1.933333	0.114858	0.198666	2.103425
2.000000	0.115725	0.206352	2.151644
2.066667	0.116596	0.214096	2.647233
2.133333	0.117471	0.221898	2.879148
2.200000	0.118348	0.229759	3.066913
2.266667	0.119229	0.237678	3.231431
2.333333	0.120113	0.245656	3.380824
2.400000	0.121000	0.253693	3.519279
2.466667	0.121891	0.261790	3.649296
2.533333	0.122784	0.269945	3.772516
2.600000	0.123681	0.278161	3.890087
2.666667	0.124582	0.286436	4.002851
2.733333	0.125485	0.294772	4.111449
2.800000	0.126392	0.303168	4.216383
2.866667	0.127302	0.311624	4.318057
2.933333	0.128216	0.320142	4.416801
3.000000	0.129132	0.328720	4.512889
3.066667	0.130052	0.337359	4.606552
3.133333	0.130975	0.346060	4.697989
3.200000	0.131902	0.354823	4.787369
3.266667	0.132831	0.363647	4.874841
3.333333	0.133764	0.372534	4.960536
3.400000	0.134701	0.381483	5.044569
3.466667	0.135640	0.390494	5.127042
3.533333	0.136583	0.399568	5.208048
3.600000	0.137529	0.408705	5.287668
3.666667	0.138478	0.417905	5.365977
3.733333	0.139431	0.427169	5.443044
3.800000	0.140387	0.436496	5.518931
3.866667	0.141346	0.445887	5.593693
3.933333	0.142308	0.455342	5.667384
4.000000	0.143274	0.464862	5.740050
4.066667	0.144243	0.474446	5.811737
4.133333	0.145215	0.484094	5.882486
4.200000	0.146190	0.493808	5.952334
4.266667	0.147169	0.503586	6.021317
4.333333	0.148151	0.513430	6.089468
4.400000	0.149136	0.523340	6.156818
4.466667	0.150124	0.533315	6.223397
4.533333	0.151116	0.543357	6.289230
4.600000	0.152111	0.553464	6.354345
4.666667	0.153109	0.563638	6.418766
4.733333	0.154111	0.573879	6.482514
4.800000	0.155116	0.584186	6.545611
4.866667	0.156124	0.594561	6.608079
4.933333	0.157135	0.605003	6.669935
5.000000	0.158150	0.615513	6.731199
5.066667	0.159168	0.626090	7.409840
5.133333	0.160189	0.636735	8.598477
5.200000	0.161213	0.647448	10.11695
5.266667	0.162241	0.658230	11.89797
5.333333	0.163272	0.669081	13.89811
5.400000	0.164306	0.680000	16.08263
5.466667	0.165343	0.690988	18.41995
5.533333	0.166384	0.702046	20.87933

5.600000	0.167428	0.713173	23.42981
5.666667	0.168475	0.724370	26.03983
5.733333	0.169526	0.735636	28.67721
5.800000	0.170579	0.746973	31.30952
5.866667	0.171636	0.758380	33.90448
5.933333	0.172697	0.769858	36.43064
6.000000	0.173760	0.781407	38.85813

END FTABLE 7
FTABLE 5
92 4

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.001802	0.000000	0.000000		
0.144444	0.001802	0.000260	0.371289		
0.288889	0.001802	0.000521	0.525081		
0.433333	0.001802	0.000781	0.643091		
0.577778	0.001802	0.001041	0.742577		
0.722222	0.001802	0.001302	0.830227		
0.866667	0.001802	0.001562	0.909468		
1.011111	0.001802	0.001822	0.982337		
1.155556	0.001802	0.002082	1.050163		
1.300000	0.001802	0.002343	1.113866		
1.444444	0.001802	0.002603	1.174118		
1.588889	0.001802	0.002863	1.231425		
1.733333	0.001802	0.003124	1.286182		
1.877778	0.001802	0.003384	1.338700		
2.022222	0.001802	0.003644	1.389235		
2.166667	0.001802	0.003905	1.437995		
2.311111	0.001802	0.004165	1.485155		
2.455556	0.001802	0.004425	1.530862		
2.600000	0.001802	0.004685	1.575244		
2.744444	0.001802	0.004946	1.618410		
2.888889	0.001802	0.005206	1.660453		
3.033333	0.001802	0.005466	1.701458		
3.177778	0.001802	0.005727	1.741498		
3.322222	0.001802	0.005987	1.780638		
3.466667	0.001802	0.006247	1.818935		
3.611111	0.001802	0.006508	1.856443		
3.755556	0.001802	0.006768	1.893208		
3.900000	0.001802	0.007028	1.929272		
4.044444	0.001802	0.007289	1.964675		
4.188889	0.001802	0.007549	1.999450		
4.333333	0.001802	0.007809	2.033632		
4.477778	0.001802	0.008069	2.067248		
4.622222	0.001802	0.008330	2.100326		
4.766667	0.001802	0.008590	2.132891		
4.911111	0.001802	0.008850	2.164966		
5.055556	0.001802	0.009111	2.196573		
5.200000	0.001802	0.009371	2.227732		
5.344444	0.001802	0.009631	2.258461		
5.488889	0.001802	0.009892	2.288777		
5.633333	0.001802	0.010152	2.318697		
5.777778	0.001802	0.010412	2.348235		
5.922222	0.001802	0.010673	2.377407		
6.066667	0.001802	0.010933	2.406225		
6.211111	0.001802	0.011193	2.434702		
6.355556	0.001802	0.011453	2.462850		
6.500000	0.001802	0.011714	2.490680		
6.644444	0.001802	0.011974	2.518202		
6.788889	0.001802	0.012234	2.545427		
6.933333	0.001802	0.012495	2.572363		
7.077778	0.001802	0.012755	2.599020		
7.222222	0.001802	0.013015	2.625407		
7.366667	0.001802	0.013276	2.651531		
7.511111	0.001802	0.013536	2.677400		
7.655556	0.001802	0.013796	2.703022		
7.800000	0.001802	0.014056	2.728403		
7.944444	0.001802	0.014317	2.753550		
8.088889	0.001802	0.014577	2.778470		
8.233333	0.001802	0.014837	2.803168		

```
8.377778  0.001802  0.015098  2.827650
8.522222  0.001802  0.015358  2.851922
8.666667  0.001802  0.015618  2.875989
8.811111  0.001802  0.015879  2.899857
8.955556  0.001802  0.016139  2.923530
9.100000  0.001802  0.016399  2.947012
9.244444  0.001802  0.016660  2.970309
9.388889  0.001802  0.016920  2.993425
9.533333  0.001802  0.017180  3.016363
9.677778  0.001802  0.017440  3.039128
9.822222  0.001802  0.017701  3.061724
9.966667  0.001802  0.017961  3.084155
10.11111  0.001802  0.018221  3.361690
10.25556  0.001802  0.018482  3.818220
10.40000  0.001802  0.018742  4.035822
10.54444  0.001802  0.019002  4.205181
10.68889  0.001802  0.019263  4.355800
10.83333  0.001802  0.019523  4.493323
10.97778  0.001802  0.019783  4.621014
11.12222  0.001802  0.020043  4.740960
11.26667  0.001802  0.020304  4.854595
11.41111  0.001802  0.020564  4.962953
11.55556  0.001802  0.020824  5.066808
11.70000  0.001802  0.021085  5.166760
11.84444  0.001802  0.021345  5.263283
11.98889  0.001802  0.021605  5.356760
12.13333  0.001802  0.021866  5.447507
12.27778  0.001802  0.022126  5.535787
12.42222  0.001802  0.022386  5.621822
12.56667  0.001802  0.022647  5.705801
12.71111  0.001802  0.022907  5.787889
12.85556  0.001802  0.023167  5.868227
13.00000  0.001802  0.023427  5.946940
13.14444  0.001802  0.023688  6.024138
END FTABLE  5
FTABLE      4
 59    4
   Depth      Area    Volume  Outflow1 Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
0.000000  0.028696  0.000000  0.000000
0.060440  0.028696  0.000728  0.000000
0.120879  0.028696  0.001457  0.000000
0.181319  0.028696  0.002185  0.000360
0.241758  0.028696  0.002914  0.000866
0.302198  0.028696  0.003642  0.001681
0.362637  0.028696  0.004371  0.002855
0.423077  0.028696  0.005099  0.004432
0.483516  0.028696  0.005828  0.004555
0.543956  0.028696  0.006556  0.006449
0.604396  0.028696  0.007284  0.008944
0.664835  0.028696  0.008013  0.011949
0.725275  0.028696  0.008741  0.015495
0.785714  0.028696  0.009470  0.018837
0.846154  0.028696  0.010198  0.019611
0.906593  0.028696  0.010927  0.024326
0.967033  0.028696  0.011655  0.029667
1.027473  0.028696  0.012383  0.035658
1.087912  0.028696  0.013112  0.042324
1.148352  0.028696  0.013840  0.045937
1.208791  0.028696  0.014569  0.049689
1.269231  0.028696  0.015297  0.057775
1.329670  0.028696  0.016026  0.066605
1.390110  0.028696  0.016754  0.076200
1.450549  0.028696  0.017483  0.086579
1.510989  0.028696  0.018202  0.088406
1.571429  0.028696  0.018922  0.097764
1.631868  0.028696  0.019642  0.109772
1.692308  0.028696  0.020362  0.122619
1.752747  0.028696  0.021081  0.136315
1.813187  0.028696  0.021801  0.148093
```

1.873626	0.028696	0.022521	0.148093
1.934066	0.028696	0.023241	0.148093
1.994505	0.028696	0.023960	0.148093
2.054945	0.028696	0.024680	0.148093
2.115385	0.028696	0.025400	0.148093
2.175824	0.028696	0.026120	0.148093
2.236264	0.028696	0.026839	0.148093
2.296703	0.028696	0.027559	0.148093
2.357143	0.028696	0.028279	0.148093
2.417582	0.028696	0.028999	0.148093
2.478022	0.028696	0.029719	0.148093
2.538462	0.028696	0.030438	0.148093
2.598901	0.028696	0.031158	0.148093
2.659341	0.028696	0.031878	0.148093
2.719780	0.028696	0.032598	0.148093
2.780220	0.028696	0.033317	0.148093
2.840659	0.028696	0.034037	0.148093
2.901099	0.028696	0.034757	0.148093
2.961538	0.028696	0.035477	0.148093
3.021978	0.028696	0.036196	0.148093
3.082418	0.028696	0.036916	0.148093
3.142857	0.028696	0.037636	0.148093
3.203297	0.028696	0.038356	0.148093
3.263736	0.028696	0.039076	0.148093
3.324176	0.028696	0.039795	0.148093
3.384615	0.028696	0.040515	0.148093
3.445055	0.028696	0.041235	0.148093
3.500000	0.028696	0.087967	0.148093

END FTABLE 4
FTABLE 3
35 6

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	outflow 3 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.028696	0.000000	0.000000	0.000000	0.000000		
0.060440	0.028696	0.001734	0.000000	0.148093	0.000000		
0.120879	0.028696	0.003469	0.000000	0.148093	0.000000		
0.181319	0.028696	0.005203	0.000000	0.148093	0.000000		
0.241758	0.028696	0.006938	0.000000	0.148093	0.000000		
0.302198	0.028696	0.008672	0.000000	0.148093	0.000000		
0.362637	0.028696	0.010406	0.000000	0.148093	0.000000		
0.423077	0.028696	0.012141	0.000000	0.148093	0.000000		
0.483516	0.028696	0.013875	0.000000	0.148093	0.000000		
0.543956	0.028696	0.015609	0.000000	0.148093	0.000000		
0.604396	0.028696	0.017344	0.000000	0.148093	0.000000		
0.664835	0.028696	0.019078	0.000000	0.148093	0.000000		
0.725275	0.028696	0.020813	0.000000	0.148093	0.000000		
0.785714	0.028696	0.022547	0.000000	0.148093	0.000000		
0.846154	0.028696	0.024281	0.000000	0.148093	0.000000		
0.906593	0.028696	0.026016	0.000000	0.148093	0.000000		
0.967033	0.028696	0.027750	0.000000	0.148093	0.000000		
1.027473	0.028696	0.029484	0.032183	0.148093	0.000000		
1.087912	0.028696	0.031219	0.181987	0.148093	0.000000		
1.148352	0.028696	0.032953	0.380280	0.148093	0.000000		
1.208791	0.028696	0.034688	0.573677	0.148093	0.000000		
1.269231	0.028696	0.036422	0.715919	0.148093	0.000000		
1.329670	0.028696	0.038156	0.795819	0.148093	0.000000		
1.390110	0.028696	0.039891	0.874320	0.148093	0.000000		
1.450549	0.028696	0.041625	0.939611	0.148093	0.000000		
1.510989	0.028696	0.043359	1.000651	0.148093	0.000000		
1.571429	0.028696	0.045094	1.058176	0.148093	0.000000		
1.631868	0.028696	0.046828	1.112731	0.148093	0.000000		
1.692308	0.028696	0.048563	1.164734	0.148093	0.000000		
1.752747	0.028696	0.050297	1.214511	0.148093	0.000000		
1.813187	0.028696	0.052031	1.262328	0.148093	0.000000		
1.873626	0.028696	0.053766	1.308398	0.148093	0.000000		
1.934066	0.028696	0.055500	1.352900	0.148093	0.000000		
1.994505	0.028696	0.057234	1.395985	0.148093	0.000000		
2.000000	0.028696	0.057392	1.437778	0.148093	0.000000		

END FTABLE 3
FTABLE 6
90 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.002296	0.000000	0.000000	0.000000		
0.111111	0.002296	0.000255	0.144730	0.000000		
0.222222	0.002296	0.000510	0.204679	0.000000		
0.333333	0.002296	0.000765	0.250679	0.000000		
0.444444	0.002296	0.001020	0.289459	0.000000		
0.555556	0.002296	0.001275	0.323625	0.000000		
0.666667	0.002296	0.001530	0.354514	0.000000		
0.777778	0.002296	0.001786	0.382919	0.000000		
0.888889	0.002296	0.002041	0.409357	0.000000		
1.000000	0.002296	0.002296	0.434189	0.000000		
1.111111	0.002296	0.002551	0.457675	0.000000		
1.222222	0.002296	0.002806	0.480014	0.000000		
1.333333	0.002296	0.003061	0.501358	0.000000		
1.444444	0.002296	0.003316	0.521830	0.000000		
1.555556	0.002296	0.003571	0.541529	0.000000		
1.666667	0.002296	0.003826	0.560535	0.000000		
1.777778	0.002296	0.004081	0.578919	0.000000		
1.888889	0.002296	0.004336	0.596736	0.000000		
2.000000	0.002296	0.004591	0.614036	0.000000		
2.111111	0.002296	0.004846	0.630862	0.000000		
2.222222	0.002296	0.005102	0.647251	0.000000		
2.333333	0.002296	0.005357	0.663234	0.000000		
2.444444	0.002296	0.005612	0.678842	0.000000		
2.555556	0.002296	0.005867	0.694099	0.000000		
2.666667	0.002296	0.006122	0.709027	0.000000		
2.777778	0.002296	0.006377	0.723648	0.000000		
2.888889	0.002296	0.006632	0.737979	0.000000		
3.000000	0.002296	0.006887	0.752037	0.000000		
3.111111	0.002296	0.007142	0.765837	0.000000		
3.222222	0.002296	0.007397	0.779393	0.000000		
3.333333	0.002296	0.007652	0.792717	0.000000		
3.444444	0.002296	0.007907	0.805820	0.000000		
3.555556	0.002296	0.008162	0.818714	0.000000		
3.666667	0.002296	0.008418	0.831408	0.000000		
3.777778	0.002296	0.008673	0.843912	0.000000		
3.888889	0.002296	0.008928	0.856232	0.000000		
4.000000	0.002296	0.009183	0.868378	0.000000		
4.111111	0.002296	0.009438	0.880356	0.000000		
4.222222	0.002296	0.009693	0.892173	0.000000		
4.333333	0.002296	0.009948	0.903836	0.000000		
4.444444	0.002296	0.010203	0.915351	0.000000		
4.555556	0.002296	0.010458	0.926722	0.000000		
4.666667	0.002296	0.010713	0.937955	0.000000		
4.777778	0.002296	0.010968	0.949056	0.000000		
4.888889	0.002296	0.011223	0.960028	0.000000		
5.000000	0.002296	0.011478	0.970876	0.000000		
5.111111	0.002296	0.011733	0.981604	1.571452		
5.222222	0.002296	0.011989	0.992216	4.439323		
5.333333	0.002296	0.012244	1.002716	8.137338		
5.444444	0.002296	0.012499	1.013107	12.47484		
5.555556	0.002296	0.012754	1.023393	17.30957		
5.666667	0.002296	0.013009	1.033576	22.50982		
5.777778	0.002296	0.013264	1.043660	27.94298		
5.888889	0.002296	0.013519	1.053648	33.47296		
6.000000	0.002296	0.013774	1.063541	38.96176		
6.111111	0.002296	0.014029	1.258257	44.27365		
6.222222	0.002296	0.014284	1.452208	49.28090		
6.333333	0.002296	0.014539	1.547295	53.87097		
6.444444	0.002296	0.014794	1.627166	57.95469		
6.555556	0.002296	0.015049	1.698588	61.47536		
6.666667	0.002296	0.015305	1.763986	64.41869		
6.777778	0.002296	0.015560	1.824803	66.82347		
6.888889	0.002296	0.015815	1.881977	68.79292		
7.000000	0.002296	0.016070	1.936163	70.50672		
7.111111	0.002296	0.016325	1.987837	73.22090		

7.222222	0.002296	0.016580	2.037359	75.12306
7.333333	0.002296	0.016835	2.085009	76.97823
7.444444	0.002296	0.017090	2.131009	78.78973
7.555556	0.002296	0.017345	2.175541	80.56051
7.666667	0.002296	0.017600	2.218753	82.29319
7.777778	0.002296	0.017855	2.260772	83.99013
7.888889	0.002296	0.018110	2.301702	85.65347
8.000000	0.002296	0.018365	2.341634	87.28511
8.111111	0.002296	0.018621	2.380647	88.88680
8.222222	0.002296	0.018876	2.418809	90.46014
8.333333	0.002296	0.019131	2.456180	92.00658
8.444444	0.002296	0.019386	2.492813	93.52746
8.555556	0.002296	0.019641	2.528755	95.02399
8.666667	0.002296	0.019896	2.564049	96.49732
8.777778	0.002296	0.020151	2.598731	97.94849
8.888889	0.002296	0.020406	2.632837	99.37847
9.000000	0.002296	0.020661	2.666396	100.7882
9.111111	0.002296	0.020916	2.699439	102.1784
9.222222	0.002296	0.021171	2.731989	103.5500
9.333333	0.002296	0.021426	2.764072	104.9036
9.444444	0.002296	0.021681	2.795708	106.2401
9.555556	0.002296	0.021937	2.826917	107.5599
9.666667	0.002296	0.022192	2.857719	108.8637
9.777778	0.002296	0.022447	2.888129	110.1520
9.888889	0.002296	0.022702	2.918165	111.4255

END FTABLE 6
FTABLE 8
91 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.000092	0.000000	0.000000	0.000000		
0.022222	0.000100	0.000002	9.320408	0.000076		
0.044444	0.000109	0.000004	13.18105	0.000082		
0.066667	0.000118	0.000007	16.14342	0.000089		
0.088889	0.000127	0.000010	18.64082	0.000096		
0.111111	0.000137	0.000013	20.84107	0.000104		
0.133333	0.000147	0.000016	22.83024	0.000111		
0.155556	0.000158	0.000019	24.65948	0.000119		
0.177778	0.000169	0.000023	26.36210	0.000128		
0.200000	0.000180	0.000027	27.96123	0.000136		
0.222222	0.000192	0.000031	29.47372	0.000145		
0.244444	0.000204	0.000035	30.91230	0.000154		
0.266667	0.000216	0.000040	32.28684	0.000163		
0.288889	0.000229	0.000045	33.60521	0.000173		
0.311111	0.000242	0.000050	34.87377	0.000183		
0.333333	0.000255	0.000056	36.09779	0.000193		
0.355556	0.000269	0.000061	37.28163	0.000203		
0.377778	0.000283	0.000068	38.42903	0.000214		
0.400000	0.000298	0.000074	39.54314	0.000225		
0.422222	0.000312	0.000081	40.62672	0.000236		
0.444444	0.000328	0.000088	41.68213	0.000248		
0.466667	0.000343	0.000095	42.71148	0.000260		
0.488889	0.000359	0.000103	43.71659	0.000272		
0.511111	0.000376	0.000111	44.69911	0.000284		
0.533333	0.000392	0.000120	45.66049	0.000297		
0.555556	0.000409	0.000129	46.60204	0.000309		
0.577778	0.000427	0.000138	47.52494	0.000323		
0.600000	0.000444	0.000148	48.43026	0.000336		
0.622222	0.000463	0.000158	49.31897	0.000350		
0.644444	0.000481	0.000168	50.19194	0.000364		
0.666667	0.000500	0.000179	51.04998	0.000378		
0.688889	0.000519	0.000190	51.89384	0.000393		
0.711111	0.000539	0.000202	52.72419	0.000407		
0.733333	0.000559	0.000214	53.54167	0.000423		
0.755556	0.000579	0.000227	54.35099	0.000438		
0.777778	0.000600	0.000240	55.18653	0.000454		
0.800000	0.000621	0.000254	56.03414	0.000469		
0.822222	0.000642	0.000268	56.88773	0.000486		
0.844444	0.000664	0.000282	57.74481	0.000502		
0.866667	0.000686	0.000297	58.60403	0.000519		

```
  0.888889  0.000709  0.000313  59.46453  0.000536
  0.911111  0.000731  0.000329  60.32576  0.000553
  0.933333  0.000755  0.000345  61.18735  0.000571
  0.955556  0.000778  0.000362  62.04903  0.000589
  0.977778  0.000802  0.000380  62.91060  0.000607
  1.000000  0.000826  0.000398  63.77195  0.000625
  1.022222  0.000851  0.000417  64.60354  0.000644
  1.044444  0.000876  0.000436  65.54409  0.000663
  1.066667  0.000902  0.000456  66.55312  0.000682
  1.088889  0.000927  0.000476  67.61630  0.000701
  1.111111  0.000953  0.000497  68.72544  0.000721
  1.133333  0.000980  0.000518  69.87506  0.000741
  1.155556  0.001007  0.000540  71.06115  0.000761
  1.177778  0.001034  0.000563  72.28061  0.000782
  1.200000  0.001062  0.000586  73.53094  0.000803
  1.222222  0.001089  0.000610  74.81007  0.000824
  1.244444  0.001118  0.000635  76.11621  0.000845
  1.266667  0.001146  0.000660  77.44778  0.000867
  1.288889  0.001175  0.000686  78.80339  0.000889
  1.311111  0.001205  0.000712  80.18174  0.000911
  1.333333  0.001235  0.000739  81.58166  0.000934
  1.355556  0.001265  0.000767  83.00202  0.000956
  1.377778  0.001295  0.000795  84.44176  0.000979
  1.400000  0.001326  0.000825  85.89985  0.001003
  1.422222  0.001357  0.000854  87.37530  0.001026
  1.444444  0.001389  0.000885  88.86713  0.001050
  1.466667  0.001421  0.000916  90.37437  0.001074
  1.488889  0.001453  0.000948  91.89608  0.001099
  1.511111  0.001486  0.000981  93.43129  0.001123
  1.533333  0.001519  0.001014  94.97907  0.001148
  1.555556  0.001552  0.001048  96.53845  0.001174
  1.577778  0.001586  0.001083  98.10848  0.001199
  1.600000  0.001620  0.001119  99.68820  0.001225
  1.622222  0.001654  0.001155  101.2766  0.001251
  1.644444  0.001689  0.001192  102.8728  0.001277
  1.666667  0.001724  0.001230  104.4757  0.001304
  1.688889  0.001760  0.001269  106.0843  0.001331
  1.711111  0.001796  0.001308  107.6977  0.001358
  1.733333  0.001832  0.001349  109.3148  0.001385
  1.755556  0.001869  0.001390  110.9346  0.001413
  1.777778  0.001906  0.001432  112.5560  0.001441
  1.800000  0.001943  0.001474  114.1781  0.001469
  1.822222  0.001981  0.001518  115.7997  0.001498
  1.844444  0.002019  0.001562  117.4199  0.001527
  1.866667  0.002057  0.001608  119.0375  0.001556
  1.888889  0.002096  0.001654  120.6516  0.001585
  1.911111  0.002135  0.001701  122.2611  0.001615
  1.933333  0.002175  0.001749  123.8649  0.001645
  1.955556  0.002215  0.001798  125.4619  0.001675
  1.977778  0.002255  0.001847  127.0512  0.001705
  2.000000  0.002296  0.001898  128.6317  0.001736
  END FTABLE  8
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1               PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1               IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1               PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1               IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1               RCHRES   1     EXTNL  PREC
WDM      2 PREC     ENGL    1               RCHRES   3     EXTNL  PREC
WDM      2 PREC     ENGL    1               RCHRES   7     EXTNL  PREC
WDM      2 PREC     ENGL    1               RCHRES   8     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5             RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7             RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.5             RCHRES   3     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7             RCHRES   4     EXTNL  POTEV
WDM      1 EVAP     ENGL    1               RCHRES   7     EXTNL  POTEV
```

```
WDM      1 EVAP     ENGL    1              RCHRES   8     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   7 HYDR   RO     1 1        1      WDM   1016 FLOW     ENGL      REPL
RCHRES   7 HYDR   STAGE  1 1        1      WDM   1017 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     12.1      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    801 FLOW     ENGL      REPL
RCHRES   8 HYDR   RO     1 1        1      WDM   1024 FLOW     ENGL      REPL
RCHRES   8 HYDR   O      1 1        1      WDM   1025 FLOW     ENGL      REPL
RCHRES   8 HYDR   O      2 1        1      WDM   1026 FLOW     ENGL      REPL
RCHRES   8 HYDR   STAGE  1 1        1      WDM   1027 STAG     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
RCHRES     ROFLOW                          RCHRES         INFLOW
  END MASS-LINK    6

  MASS-LINK        7
RCHRES     OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17

  MASS-LINK       18
RCHRES     OFLOW  OVOL   2                 COPY           INPUT  MEAN
  END MASS-LINK   18


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

ERROR/WARNING ID: 238   1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1962/ 6/30 24: 0

RCHRES :   1

RELERR	STORS	STOR	MATIN	MATDIF
-0.04483	0.00000	0.0000E+00	0.00000	1.6685E-12

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 238   1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1962/ 6/30 24: 0

RCHRES :   3

RELERR	STORS	STOR	MATIN	MATDIF
-4.483E-02	0.00000	0.0000E+00	0.00000	7.6712E-13

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 341   6

DATE/TIME: 1979/ 1/15 14: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition. Relevant data are:

NROWS	V1	V2	VOL
35	3.3707E+03	3380.0	3506.1

ERROR/WARNING ID: 341 5

DATE/TIME: 1979/ 1/15 14: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	3380.0	-4.933E+04	14.596	1.4596E+01	2

Disclaimer

Legal Notice

This program and accompanying documentation are provided 'as-is' without warranty of any kind. The entire risk regarding the performance and results of this program is assumed by End User. Clear Creek Solutions Inc. and the governmental licensee or sublicensees disclaim all warranties, either expressed or implied, including but not limited to implied warranties of program and accompanying documentation. In no event shall Clear Creek Solutions Inc. be liable for any damages whatsoever (including without limitation to damages for loss of business profits, loss of business information, business interruption, and the like) arising out of the use of, or inability to use this program even if Clear Creek Solutions Inc. or their authorized representatives have been advised of the possibility of such damages.

Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

HYDROLOGY REPORT

For

OCEAN HILLS ALF

4500 CANNON ROAD

OCEANSIDE, CA

Prepared For:

PROTEA SENIOR LIVING OCEANSIDE, LLC.

18 VENTANA RIDGE DR.

Aliso Viejo, CA 92656

Prepared By:

Waber Consultants, Inc.

3711 Long Beach Blvd, Suite 1008

Long Beach, CA 90807

(562) 426-8283

October 2018

Table of Contents

Tables

Appendices

Appendix A – Hydrology Calculations

Appendix B – Hydraulics Calculations

Appendix C – Reference Figures and Tables

Appendix D –Hydrology Maps

Appendix E – Hydromodification Calculations

1.0 Scope

Hydrologic calculations to evaluate surface runoff associated with 2-, 10-, 50-, and 100-year hypothetical design storm frequencies from the tributary drainage areas were performed. Hydrologic parameters used in the analysis, such as rainfall and soil classification are presented in the *San Diego County Hydrology Manual, June 2003* (Hydrology Manual).

Hydraulics calculations to evaluate pipe sizes to handle the 100-year storm event were performed using the Manning's equation.

Hydraulics calculations based on Hazen-Williams Equation was used in the sizing of dual sump pump system based on the 10-year storm event flow.

Detention basin including its riser sizing calculations were performed based on hydromodification calculations to mitigate the 2-year to 10-year storm flows and volumes using the San Diego Hydrology Model (SDHM) 3.0 Model software.

Biofiltration basins have been sized to treat the Design Capture Volume (DCV) for the site per the current Storm Water Quality Mitigation Plan, Regional Water Quality Control Board, and MS4 Permit requirements.

2.0 Project Description

2.1. Existing Conditions

The subject property is located at 4500 Cannon Road in Oceanside, California. The site consists of a relatively level 6.46-acre property that is currently a vacant lot. The property is bounded by Mystra Drive to the west, and a residential subdivision to the north and east. The site is being developed in two separate phases. Phase 1 has already been developed. This report is for Phase 2 of the development. Phase 1 is the southern portion of the lot and is 3.53 acres in size. Phase 2 is the northern portion of the lot and is 2.93 acres in size.

The existing project site has been rough graded and is relatively flat. It slopes in a generally south westerly direction into two existing drain inlets, located at the southwestern part of the site, that tie-in to existing 24" pipe. The pipe ties-in to existing curb catch basin in Mystra Drive. The subject property is bound by property walls to the north and east and, therefore, does not have upstream off-site run on.

2.2. Proposed Conditions

The proposed project is located in Phase 2 of the development and is located in the northern portion of the site. It consists of construction of a new 37,379 SF footprint 3-story assisted living facility building, new drive aisle, parking stalls, landscape areas including biofiltration basins, and underground detention tanks.

The proposed project is considered a Priority Development Project and permanent BMPs are required for treatment of storm water runoff. A separate Storm Water Quality Management Plan (SWQMP) has been prepared addressing the treatment of storm water runoff requirements including biofiltration and hydromodification.

All roof runoff is conveyed into the proposed onsite storm drain system. Surface drainage in the landscape and hardscape areas eventually drain into the proposed storm drain system. The storm drain system is routed to eventually drain onto the proposed biofiltration basin. Overflow drains in the biofiltration basins are routed to underground detention tanks located under the parking lot. Overflow from the detention tanks will drain into existing curb inlet catch basin in Mystra Drive to drain into the existing municipal storm drain system.

The proposed project is bound by existing property walls to the north and east it does not have upstream off-site run on.

3.0 Hydrology

3.1 Methodology

The hydrologic calculations to determine the 2-, 10-, 50-, and 100-year peak flow rates were performed using the criteria in the *San Diego County Hydrology Manual*. The Rational Method is an empirical computation procedure for developing a peak runoff rate (discharge) for storms of a specific recurrence interval. Rational Method equations are based on the assumption that the peak flow rate is directly proportional to the drainage area, rainfall intensity, and a loss rate coefficient, which describes the effects of land use and soil type. The Rational Method flow rates were computed by generating a hydrologic "link-node" model, which divides the area into drainage subareas. Please see Appendix A for hydrology calculations.

3.2 Areas

Hydrology Maps are included in this report delineating the drainage subareas. Areas are provided in the maps in both square feet (SF) and acres (AC). AC units are used in the rational method calculations.

3.3 Soil

Per soil report prepared by EEI, Inc. and dated ~~June 16, 2016~~, the site is underlain by soil classified as dark brown sandy clay and reddish brown clayey sand (USCS "CL" and "SC"). This soil is underlain by shallow bedrock with varying depths across the site at approximately 2' to 15' depth below existing ground surface. Therefore, Soil Type C was selected for the hydrology analysis. The project site is located 33°09'55" N, 117°16'08" W per U.S. State Plane Coordinates. Hydrologic Soil Map found in Appendix A of the Hydrology Manual is included in Appendix C of this report for reference. Project is located within Soil B area indicated in the map.

3.4 Runoff Coefficient

The runoff coefficients are based on land use and soil type. The appropriate runoff coefficient (C) was determined by applying the equation provided in Page 3-5 and C_p values presented in Table 3-1 of the Hydrology Manual. Table 3-1 is included in Appendix C of this report for reference.

3.5 Precipitation

The 6-hr and 24-hr precipitation for the 2-, 10-, 50-, and 100-yr storm events was obtained from the Isopluvial Maps located in Appendix B of the Hydrology Manual. The hydrology manual requires the 6-hr precipitation to be within the range of 45% to 65% of the 24 - hr precipitation. The calculated 6-hr precipitation both the 50- and 100-year storm events fall within the required range and is summarized in Table 1 below. Therefore, no adjustments are required.

Table 1 - Precipitation Values

Storm Event	P_6, 6-hr Precipitation (in.)	P_{24}, 24-hr Precipitation (in.)	P_6/P_{24} (%)
2-yr	1.4	2.2	63.6
10-yr	2.0	3.5	57.1
50-yr	2.5	4.5	55.6
100-yr	3.0	5.0	60.0

3.6 Time of Concentration

The Time of Concentration (T_c) is the time required for runoff to flow from the most remote part of the drainage area to the point of interest. The T_c (minutes) is based on slope and runoff coefficient and it was obtained using the equation provided in Figure 3-3 of the Hydrology Manual, and it is included in Appendix C of this report for reference.

3.7 Rainfall Intensity

The rainfall intensity is the rainfall in inches per hour (in/hr) for a duration equal to the T_c for a selected storm frequency. Intensity is dependent on 6-hour precipitation and T_c. It was obtained using the equation provided in Page 3-7 of the Hydrology Manual.

3.8 Hydrology

The peak rate runoff flow of the proposed site increases due to increase in impervious areas including roof, drive aisles, and parking spaces. However, runoff is mitigated by implementation of hydromodification using above ground detention basin as a permanent BMP. The existing and proposed flows were calculated using the Rational Method based on the site conditions discussed in Sections 2.1 and 2.2, respectively.

3.8.1 Existing Hydrology

The entire existing site sheet flows in a generally southwesterly direction towards the existing catch basin located at the southwest side of the property. The catch basin ties into the existing 24” RCP pipe that ties into the existing curb inlet catch basin located in Mystra Drive. The existing flow for the different storm frequencies is outlined in Table 2 below.

Table 2 – Summary of Existing Flow

Storm Event	Q (cfs)
2-yr	1.31
10-yr	1.87
50-yr	2.34
100-yr	2.81

3.8.2 Proposed Hydrology

The proposed project site has been subdivided into subareas for runoff of storm water based on drainage patterns including ridge lines and low/confluence points. The drainage patterns include the roof surface runoff and ground surface runoff areas. Each subarea and the discharge point of each subarea is identified in the Proposed Hydrology Map. Flow for each subarea prior to hydromodification is outlined in Table 3 below:

Table 3 – Summary of Proposed Flows Prior to Hydromodification

Subarea	Q (cfs)				Area	
	2-year	10-year	50-year	100-year	(sf)	(ac)
Area 1	1.60	2.29	2.86	3.43	32,231	0.74
Area 2	1.17	1.68	2.10	2.52	11,685	0.27
Area 3	0.64	0.92	1.15	1.37	5,823	0.13
Area 4	1.10	1.57	1.96	2.35	9,508	0.22
Area 5	2.50	3.58	4.47	5.37	20,271	0.47
Area 6	1.11	1.59	1.99	2.38	15,482	0.36
Area 7	0.31	0.44	0.55	0.66	18,359	0.42
Area 8	0.05	0.08	0.10	0.12	8,388	0.19
Area 9	0.03	0.05	0.06	0.07	4,546	0.10
Area 10	0.07	0.09	0.12	0.14	1,255	0.03
Total	**8.59**	**12.28**	**15.34**	**18.41**	**127,548**	**2.93**

However, hydromodification is applied by use of the detention basin with overflow riser and weirs in order to mitigate the increase in flow. Therefore, post-development Q $\leq$ pre-development Q. Hydromodification analysis was performed as part of the Storm Water Quality Mitigation Plan and is included in Appendix E.

The proposed site drains onto the biofiltration basin. Table 4 below summarizes tributary areas onto the basins.

4.0 Hydraulics

Hydraulics analysis was performed using Manning's equation for each subarea contributing flow to the proposed underground storm drain system. The proposed storm drain system has been designed to handle capacity for 100-year peak flow rates. Please see Appendix B for hydraulics calculations for the proposed storm drain system.

The underground tank system was designed by performing continuous simulation hydrologic modeling or an approved regression equation using San Diego Hydrology Model (SDHM) 3.1 software. The modeling was performed as part of the SWQMP report submittal. Simulation was performed for flow rates ranging from 10 percent of the predevelopment 2-year runoff event (0.1Q2) to the pre-development 10-year runoff event (Q10). This translates to flow rates of 0.251 CFS to 3.58 CFS. The basin was sized so the post-project discharge rates and durations do not exceed the pre-development rates and durations by more than 10 percent. See Appendix E for the modeling results.

The energy grade line of the storm drain pipe system is lower than the finish surface grades.

The downstream storm drain pipe is sized to have an outfall flow rate leaving the site to not exceed the proposed 100-yr flow.

5.0 Conclusion

The overall drainage patterns in the proposed condition are similar to the existing condition. However, the proposed drainage patterns are divided into multiple subareas as shown on the attached Hydrology Map – Proposed Condition. The subareas account for the ridges in the roof areas as well as the ground surfaces including the drive aisles, parking spaces, and landscape areas.

The proposed storm drain system has been designed for the 100-yr storm event. Because of the new development, there is an increase in the impervious areas and decrease in the pervious areas thus increasing the storm water runoff flow. However, as part of the SWQMP requirements, the proposed storm drain runoff flow is mitigated by implementing hydromodification requirements. Due to hydromodification Q post-development $\leq$ Q existing. Detailed hydromodification calculations are included in the approved SWQMP report, and are also included in Appendix E of this report for reference.

As part of the storm drain system one biofiltration facility and one detention tank system are required to be constructed to collect all storm drain water and treat and mitigate the required volumes and flows before leaving the site per the current Storm Water Quality Mitigation Plan, Regional Water Quality Control Board, and MS4 Permit requirements. The proposed storm drain system will tie-in to the existing curb inlet catch basin located in Mystra Drive.

The detention has been designed detain volume of storm water to mitigate runoff between $0.1Q_2$ to Q_{10}. The detention tanks are 3 feet deep concrete vaults and includes a riser 2 feet above the bottom of the vaults. The overflow pipe downstream of the riser has been sized to handle a 100-year storm event.

Appendix A – Hydrology Calculations

Existing Hydrology Calculations

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Existing Area 1

A_T =	127,547	sf	=	2.93	ac
A_P =	117,192	sf	=	2.69	ac
A_I =	10,355	sf	=	0.24	ac

% Impervious = 0.08

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.25

C = 0.30

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2))]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.30
D = 350 ft
s = 2.2 %

T = 20.64 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years

P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.48 in/hr

Selected frequency = 10 years

P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.11 in/hr

Selected frequency = 50 years

P_6 =	2.5	in	per Appendix B	
P_{24} =	4.5	in	per Appendix B	
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.64 in/hr

Selected frequency = 100 years

P_6 =	3.0	in	per Appendix B
P_{24} =	5.0	in	per Appendix B
P_6/P_{24} =	60.00	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.17 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 127,547 sf = 2.928 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 1.31 cfs

Q_{10} = 1.87 cfs

Q_{50} = 2.34 cfs

Q_{100} = 2.81 cfs

Proposed Hydrology Calculations

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 1

A_T = 32,231 sf
A_P = 4,251 sf
A_I = 27,980 sf

% Impervious = 0.87

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.82

C = 0.89

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.89
D = 400 ft
s = 0.5 %

T = 9.54 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44*P_6*T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B

P_{24} = 2.2 in per Appendix B

P_6/P_{24} = 63.64 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.43 in/hr

Selected frequency = 10 years

P_6 = 2.0 in per Appendix B

P_{24} = 3.5 in per Appendix B

P_6/P_{24} = 57.14 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.47 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 4.34 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 5.21 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 32,231 sf = 0.74 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 1.60 cfs

Q_{10} = 2.29 cfs

Q_{50} = 2.86 cfs

Q_{100} = 3.43 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 2

A_T = 11,685 sf
A_P = 1,848 sf
A_I = 9,837 sf

% Impervious = 84%

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.80

C = 0.88

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.88
D = 84 ft
s = 1.4 %

T = 3.17 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 4.95 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 7.07 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 8.83 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 10.60 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 11,685 sf = 0.268 acres

Q_2 = 1.17 cfs

Q_{10} = 1.68 cfs

Q_{50} = 2.10 cfs

Q_{100} = 2.52 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 3

A_T = 5,823 sf
A_P = 819 sf
A_I = 5,004 sf

% Impervious = 86%

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.82

C = 0.89

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.89
D = 75 ft
s = 1.7 %

T = 2.77 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44*P_6*T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 5.40 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 7.72 in/hr

Selected frequency = 50 years

P_6 =	2.5	in	per Appendix B	
P_{24} =	4.5	in	per Appendix B	
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 9.65 in/hr

Selected frequency = 100 years

P_6 =	3.0	in	per Appendix B
P_{24} =	5.0	in	per Appendix B
P_6/P_{24} =	60.00	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 11.58 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 5,823 sf = 0.134 acres

Q_2 = 0.64 cfs

Q_{10} = 0.92 cfs

Q_{50} = 1.15 cfs

Q_{100} = 1.37 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 4

A_T = 9,508 sf
A_P = 1,282 sf
A_I = 8,226 sf

% Impervious = 87%

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.82

C = 0.89

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.89
D = 76 ft
s = 2.1 %

T = 2.58 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 5.65 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 8.08 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B
P_{24} = 4.5 in per Appendix B
P_6/P_{24} = 55.56 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 10.09 in/hr

Selected frequency = 100 years
P_6 = 3.0 in per Appendix B
P_{24} = 5.0 in per Appendix B
P_6/P_{24} = 60.00 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 12.11 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 9,508 sf = 0.218 acres

Q_2 = 1.10 cfs
Q_{10} = 1.57 cfs
Q_{50} = 1.96 cfs
Q_{100} = 2.35 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 5

A_T = 20,271 sf
A_P = 6,096 sf
A_I = 14,175 sf

% Impervious = 70%

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.72

C = 0.85

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.85
D = 35 ft
s = 2 %

T = 2.15 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 6.36 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 9.09 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B
P_{24} = 4.5 in per Appendix B
P_6/P_{24} = 55.56 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 11.36 in/hr

Selected frequency = 100 years
P_6 = 3.0 in per Appendix B
P_{24} = 5.0 in per Appendix B
P_6/P_{24} = 60.00 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 13.63 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 20,271 sf = 0.465 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 2.50 cfs
Q_{10} = 3.58 cfs
Q_{50} = 4.47 cfs
Q_{100} = 5.37 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 6

A_T = 15,482 sf
A_P = 2,221 sf
A_I = 13,261 sf

% Impervious = 86%

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.81

C = 0.89

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.89
D = 286 ft
s = 1.77 %

T = 5.36 min

Calculate intensity (I) per Figure 3.2.

I = $7.44*P_6*T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 3.53 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 5.04 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 6.30 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 7.56 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 15,482 sf = 0.355 acres

Q_2 = 1.11 cfs

Q_{10} = 1.59 cfs

Q_{50} = 1.99 cfs

Q_{100} = 2.38 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 7

A_T = 18,359 sf
A_P = 16,674 sf
A_I = 1,685 sf

% Impervious = 9%

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.35

C = 0.40

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.40
D = 190 ft
s = 1.54 %

T = 14.95 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years

P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.82 in/hr

Selected frequency = 10 years

P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.60 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.25 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.90 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 18,359 sf = 0.421 acres

Q_2 = 0.31 cfs

Q_{10} = 0.44 cfs

Q_{50} = 0.55 cfs

Q_{100} = 0.66 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 8

A_T = 8,388 sf
A_P = 8,388 sf
A_I = 0 sf

% Impervious = 0%

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.30

C = 0.30

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.30
D = 110 ft
s = 0.05 %

T = 41.00 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 \cdot P_6 \cdot T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 0.95 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.36 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 1.70 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.03 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 8,388 sf = 0.193 acres

Q_2 = 0.05 cfs

Q_{10} = 0.08 cfs

Q_{50} = 0.10 cfs

Q_{100} = 0.12 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 9

A_T = 4,546 sf
A_P = 4,546 sf
A_I = 0 sf

% Impervious = 0%

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.30

C = 0.30

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.30
D = 94 ft
s = 0.059 %

T = 35.86 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.04 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.48 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 1.85 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.22 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 4,546 sf = 0.104 acres

Where Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 0.03 cfs

Q_{10} = 0.05 cfs

Q_{50} = 0.06 cfs

Q_{100} = 0.07 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 10

A_T = 1,255 sf
A_P = 0 sf
A_I = 1,255 sf

% Impervious = 100%

Soil Type = C (Soil Type C, Soil type determined from Geotechnical Investigation Report prepared by EEI)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.90

C = 0.90

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.90
D = 94 ft
s = 0.059 %

T = 8.97 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.53 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 3.62 in/hr

Selected frequency = 50 years

P_6 =	2.5	in	per Appendix B	
P_{24} =	4.5	in	per Appendix B	
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 4.52 in/hr

Selected frequency = 100 years

P_6 =	3.0	in	per Appendix B
P_{24} =	5.0	in	per Appendix B
P_6/P_{24} =	60.00	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 5.42 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 1,255 sf = 0.029 acres

Q_2 = 0.07 cfs

Q_{10} = 0.09 cfs

Q_{50} = 0.12 cfs

Q_{100} = 0.14 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Subarea	Q (cfs)				Area	
	2-year	10-year	50-year	100-year	(sf)	(ac)
Area 1	1.60	2.29	2.86	3.43	32,231	0.74
Area 2	1.17	1.68	2.10	2.52	11,685	0.27
Area 3	0.64	0.92	1.15	1.37	5,823	0.13
Area 4	1.10	1.57	1.96	2.35	9,508	0.22
Area 5	2.50	3.58	4.47	5.37	20,271	0.47
Area 6	1.11	1.59	1.99	2.38	15,482	0.36
Area 7	0.31	0.44	0.55	0.66	18,359	0.42
Area 8	0.05	0.08	0.10	0.12	8,388	0.19
Area 9	0.03	0.05	0.06	0.07	4,546	0.10
Area 10	0.07	0.09	0.12	0.14	1,255	0.03
Total	**8.59**	**12.28**	**15.34**	**18.41**	**127,548**	**2.93**

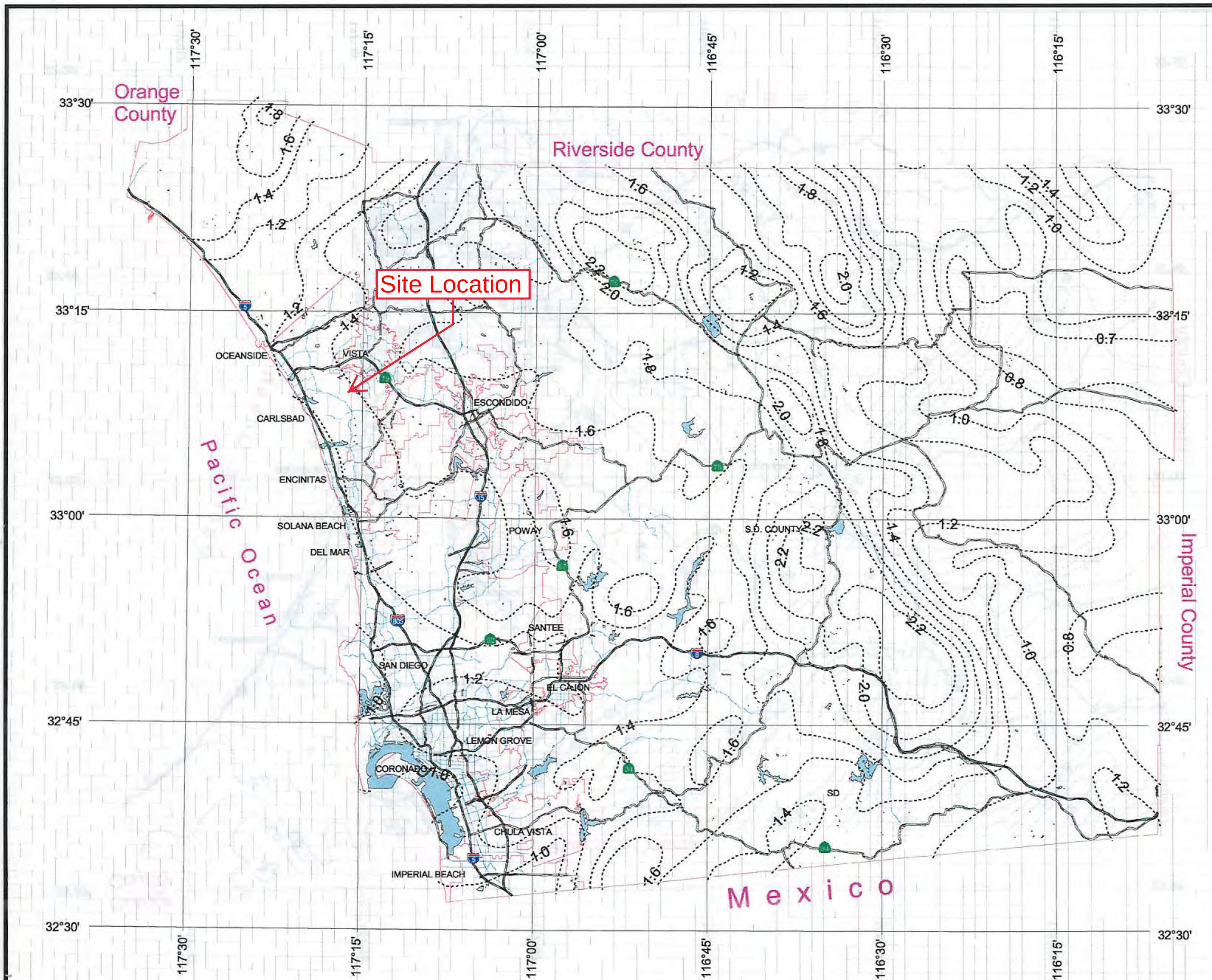
Appendix B – Hydraulics Calculations

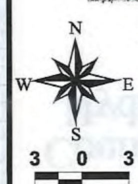
Appendix C – Reference Figures and Tables

County of San Diego Hydrology Manual

Rainfall Isopluvials

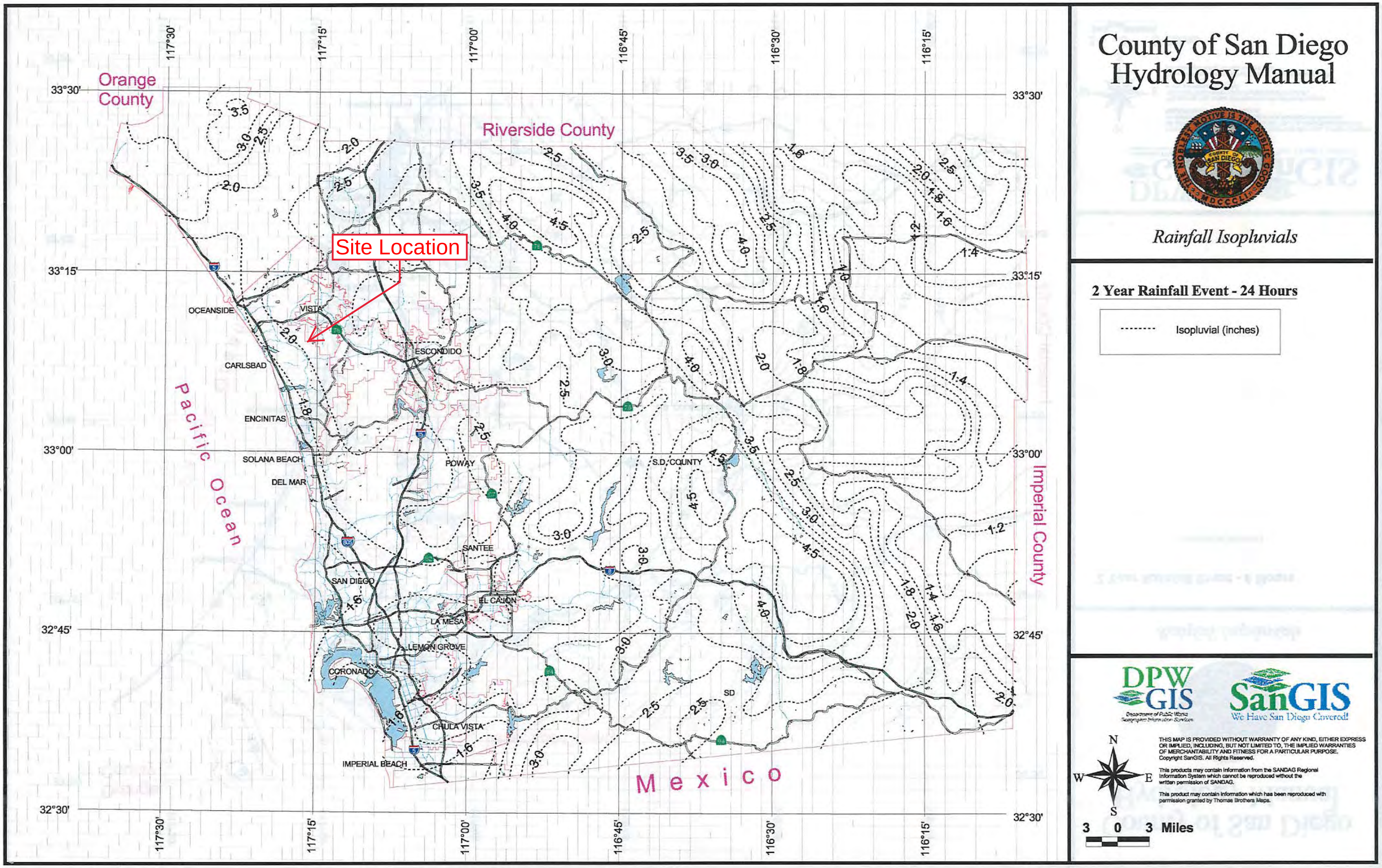
2 Year Rainfall Event - 6 Hours

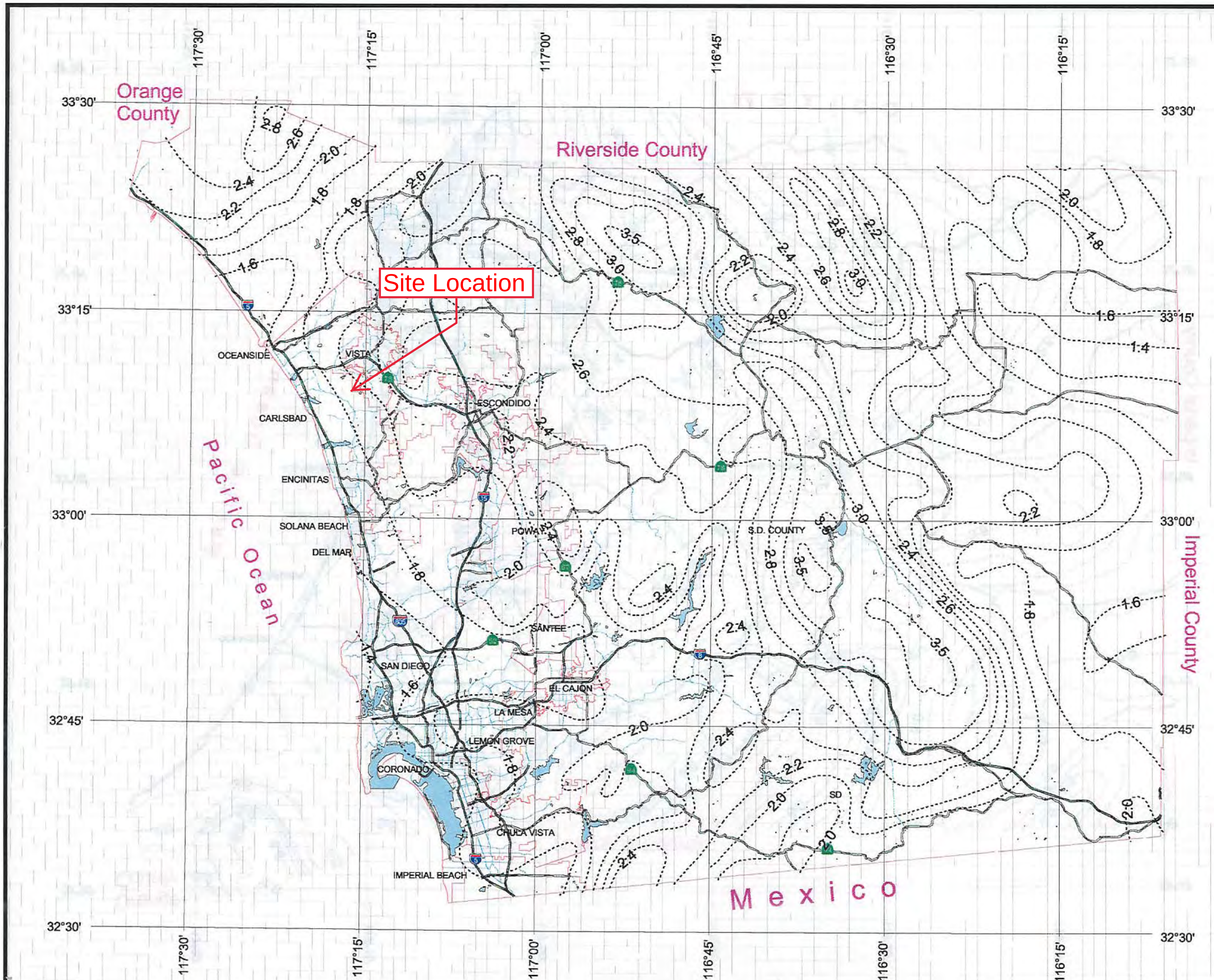




DPW GIS

SanGIS We Have San Diego Covered!


County of San Diego
Hydrology Manual
Rainfall Isopluvials
2 Year Rainfall Event - 24 Hours
Isopluvial (inches)
DPW GIS
SanGIS
We Have San Diego Covered!
THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Copyright SanGIS. All Rights Reserved.
This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.
This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.
N
S
E
W
3 0 3 Miles
Site Location
Orange County
Riverside County
Imperial County
Pacific Ocean
Mexico
OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
CHULA VISTA
IMPERIAL BEACH
SD
33°30'
33°15'
33°00'
32°45'
32°30'
117°30'
117°15'
117°00'
116°45'
116°30'
116°15'



County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

------- Isopluvial (inches)

DPW GIS

SanGIS
We Have San Diego Covered!

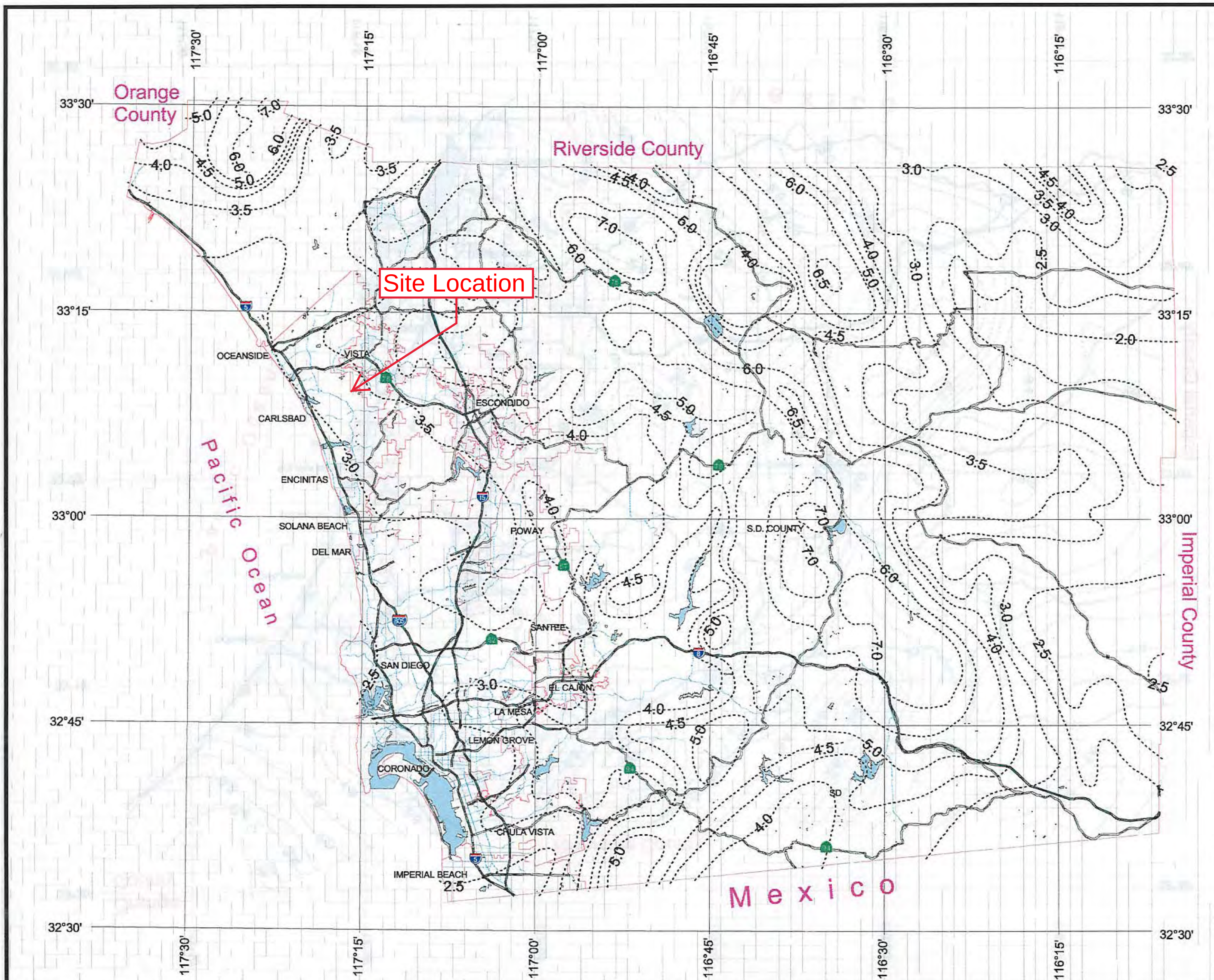
N
W E
S

3 0 3 Miles

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.



County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS

SanGIS
We Have San Diego Covered!

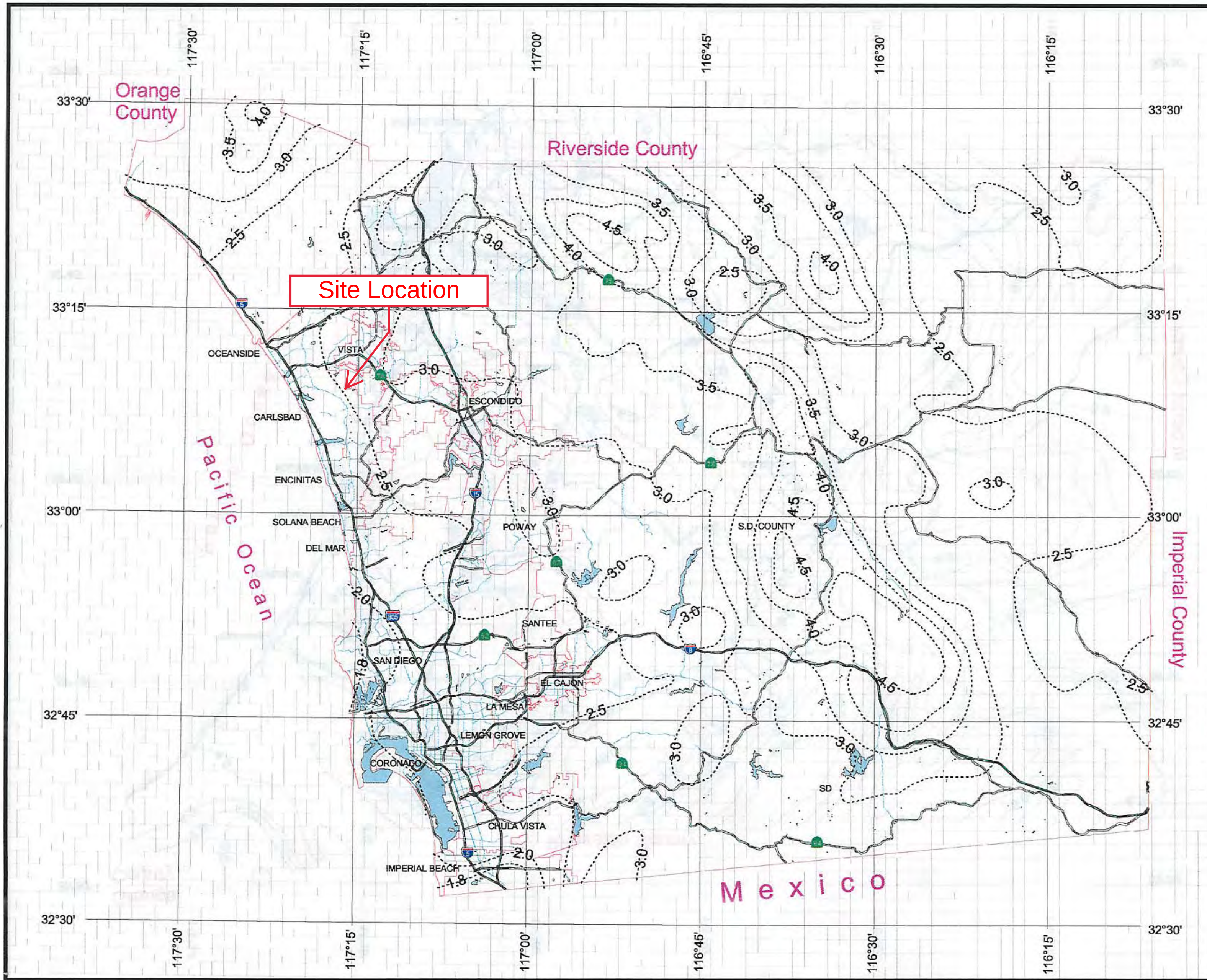
THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

N S E W

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluviais

50 Year Rainfall Event - 6 Hours

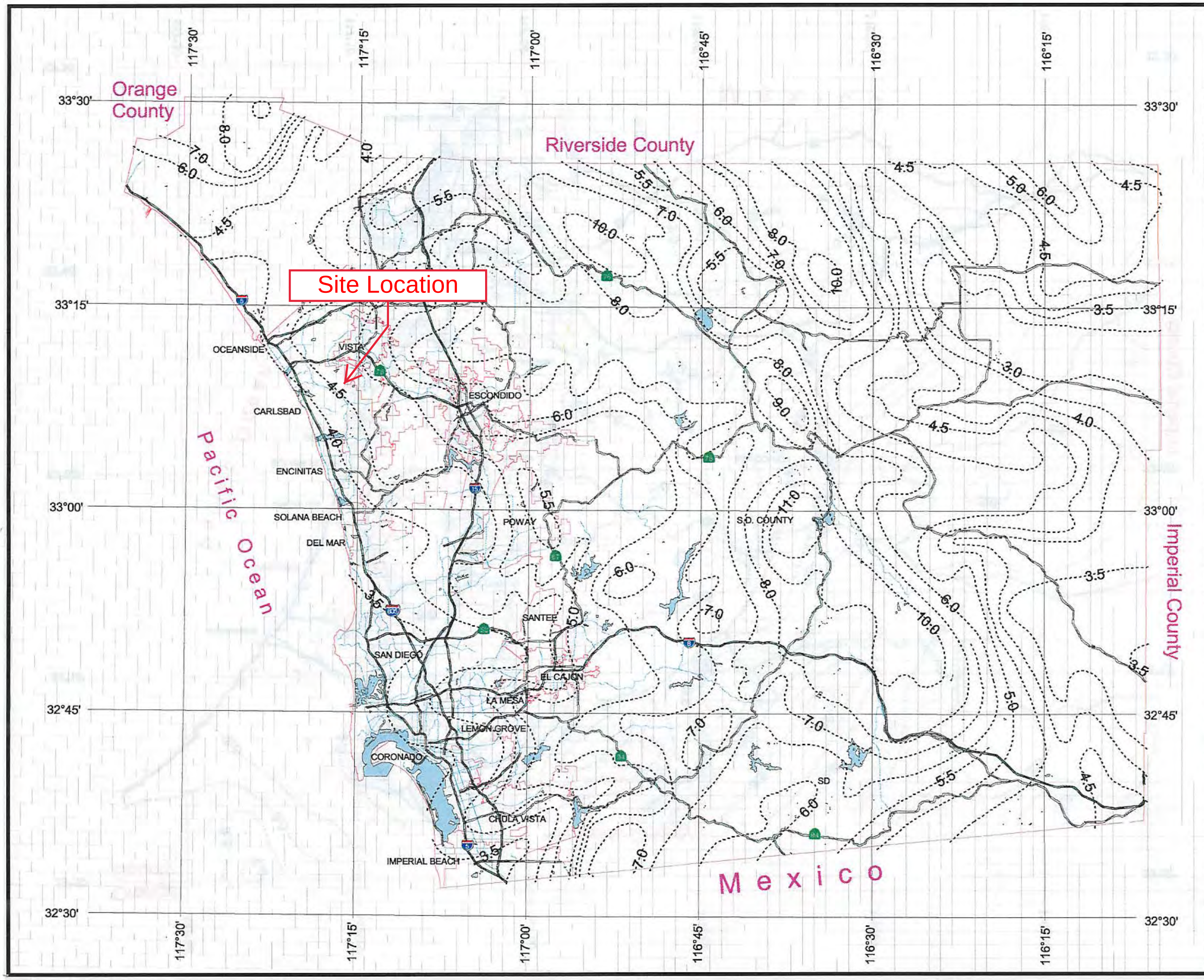
------- Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

-------- Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

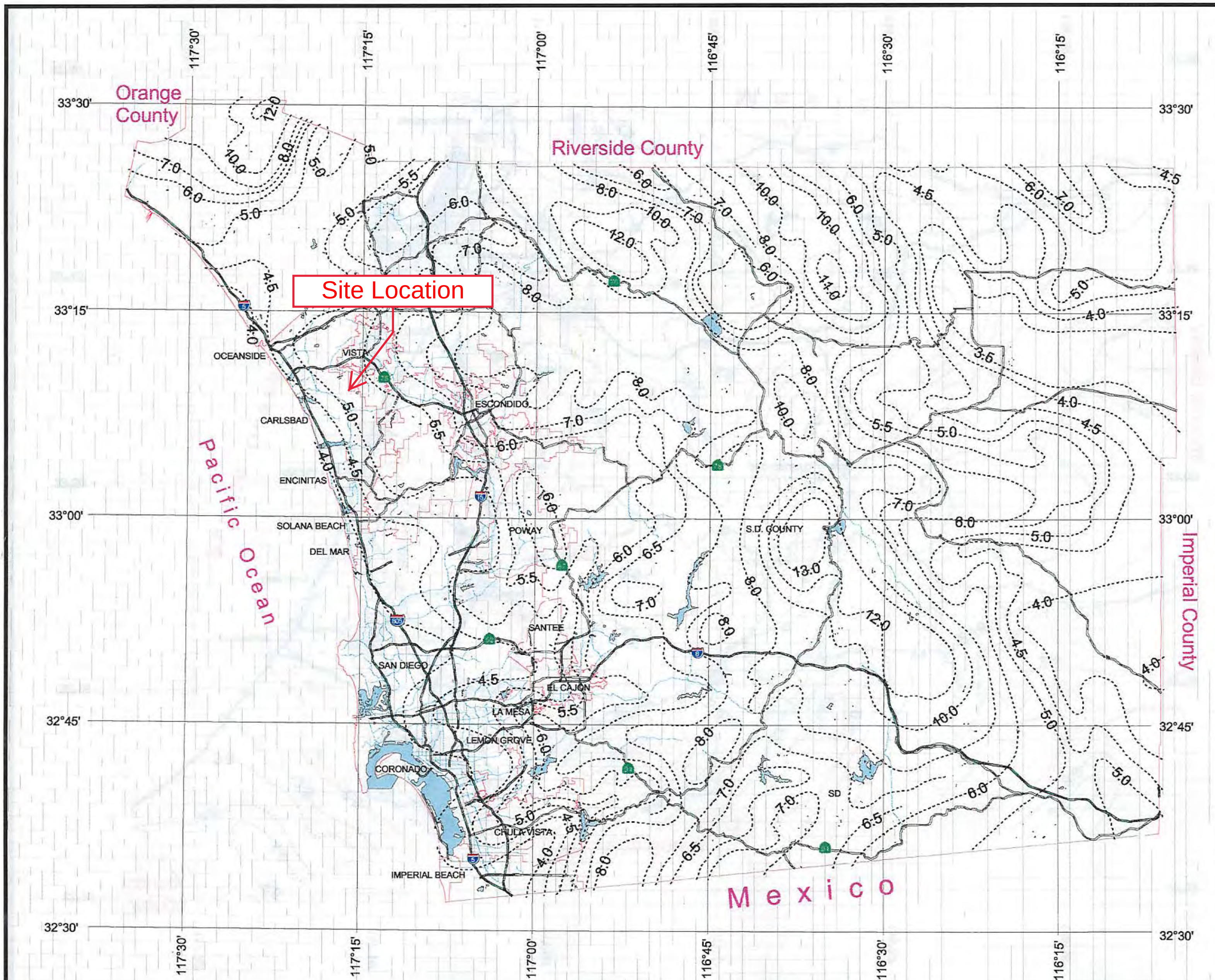
3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

------- Isopluvial (inches)



DPW GIS

SanGIS — We Have San Diego Covered!

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

N E S W

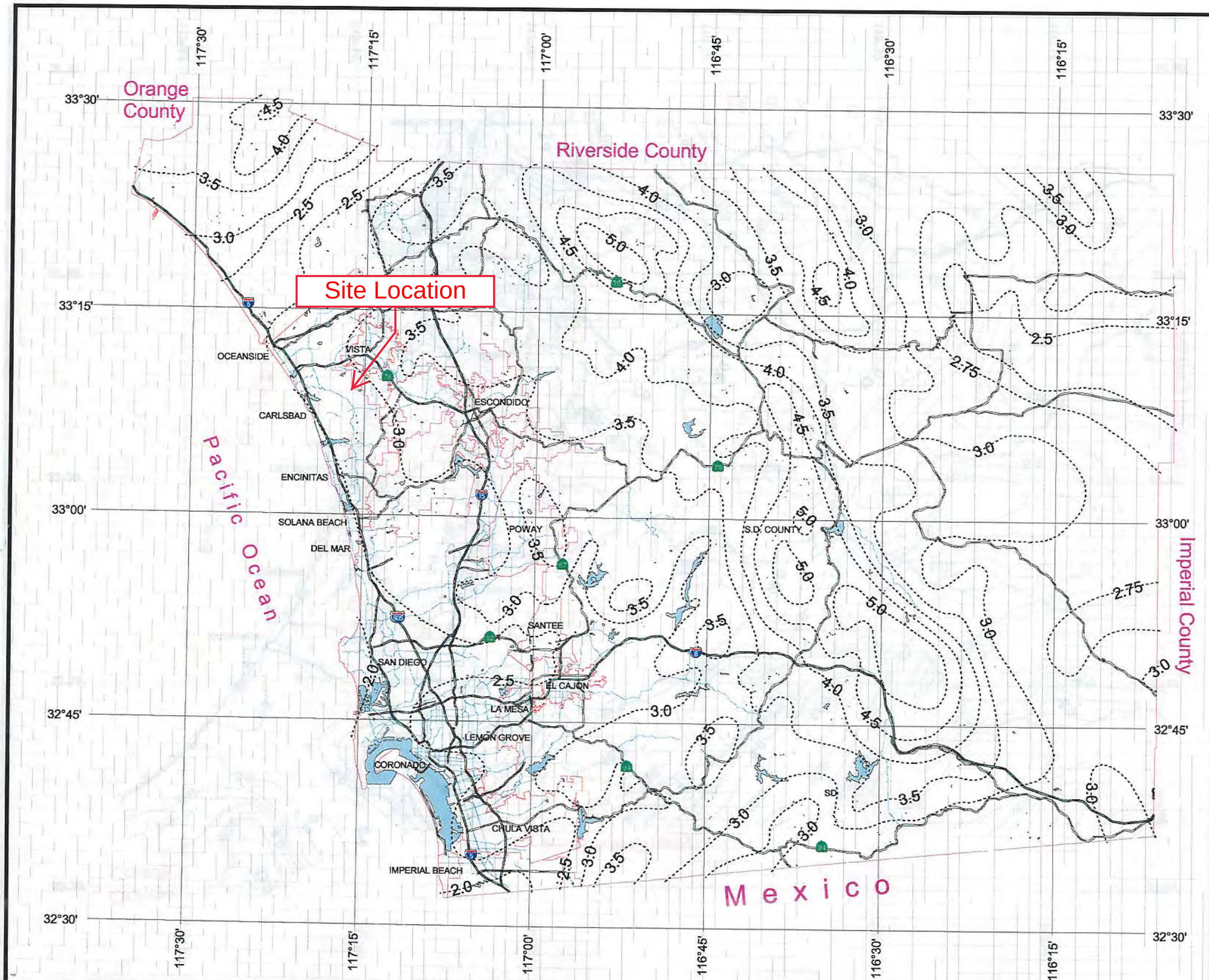
3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

-------	Isopluvial (inches)



DPW GIS

SanGIS We Have San Diego Covered!

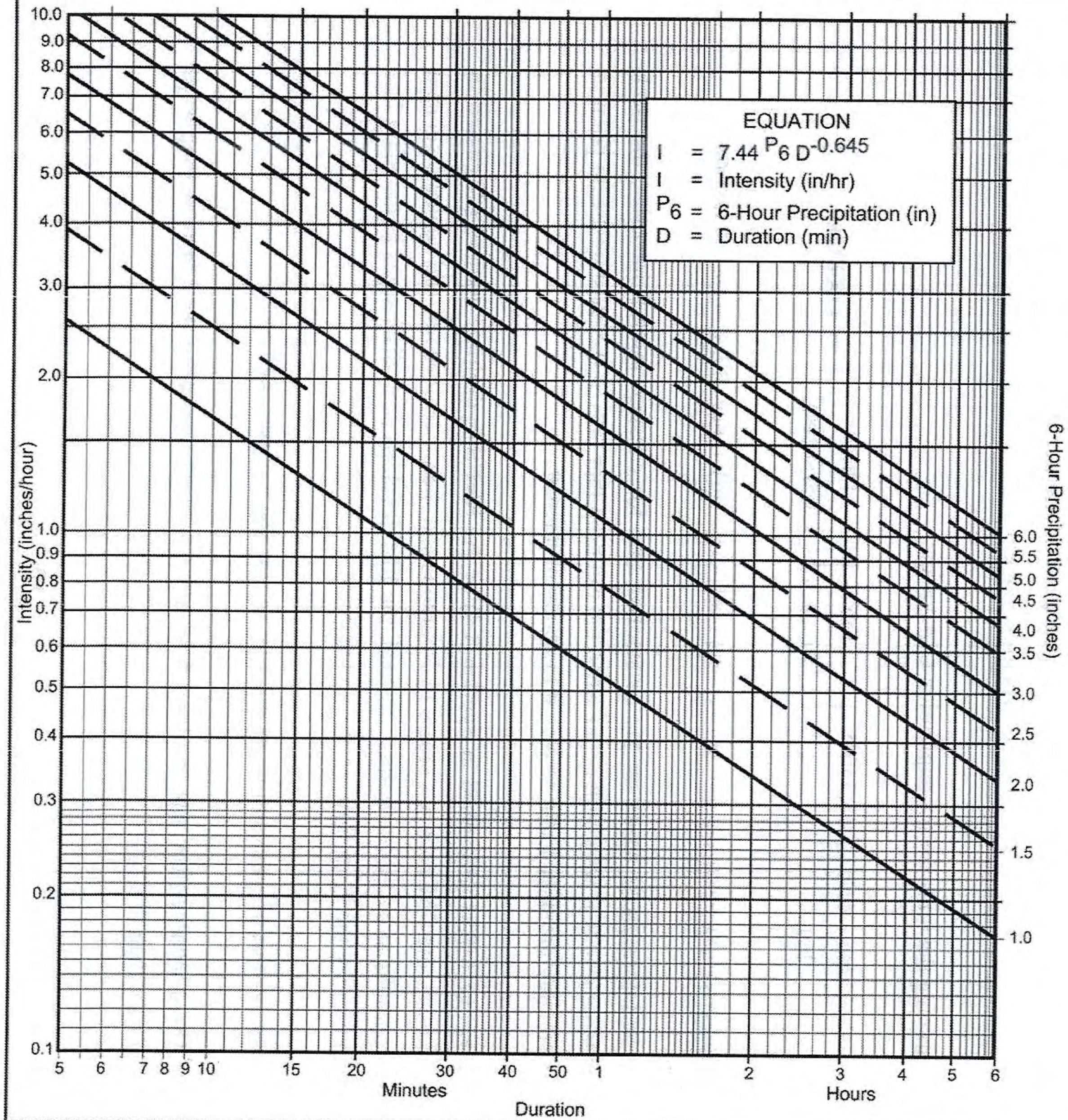
THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

N S E W

3 0 3 Miles



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency ______ year

(b) P_6 = ______ in., P_{24} = ______, $\frac{P_6}{P_{24}}$ = ______ %(2)

(c) Adjusted $P_6^{(2)}$ = ______ in.

(d) t_x = ______ min.

(e) I = ______ in./hr.

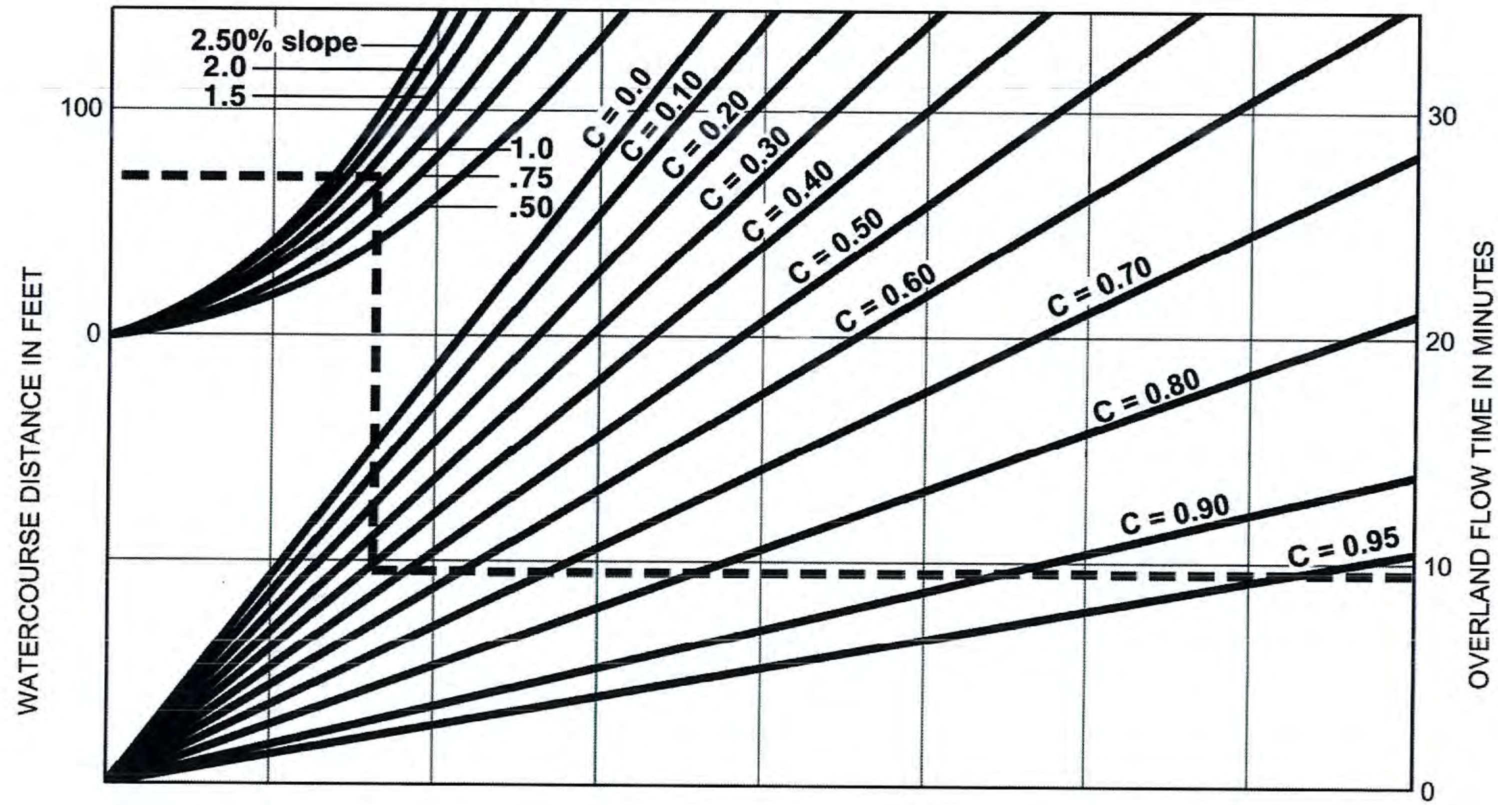
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE

3-1



EXAMPLE:

Given: Watercourse Distance (D) = 70 Feet

Slope (s) = 1.3%

Runoff Coefficient (C) = 0.41

Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE **3-3**

Rational Formula - Overland Time of Flow Nomograph

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

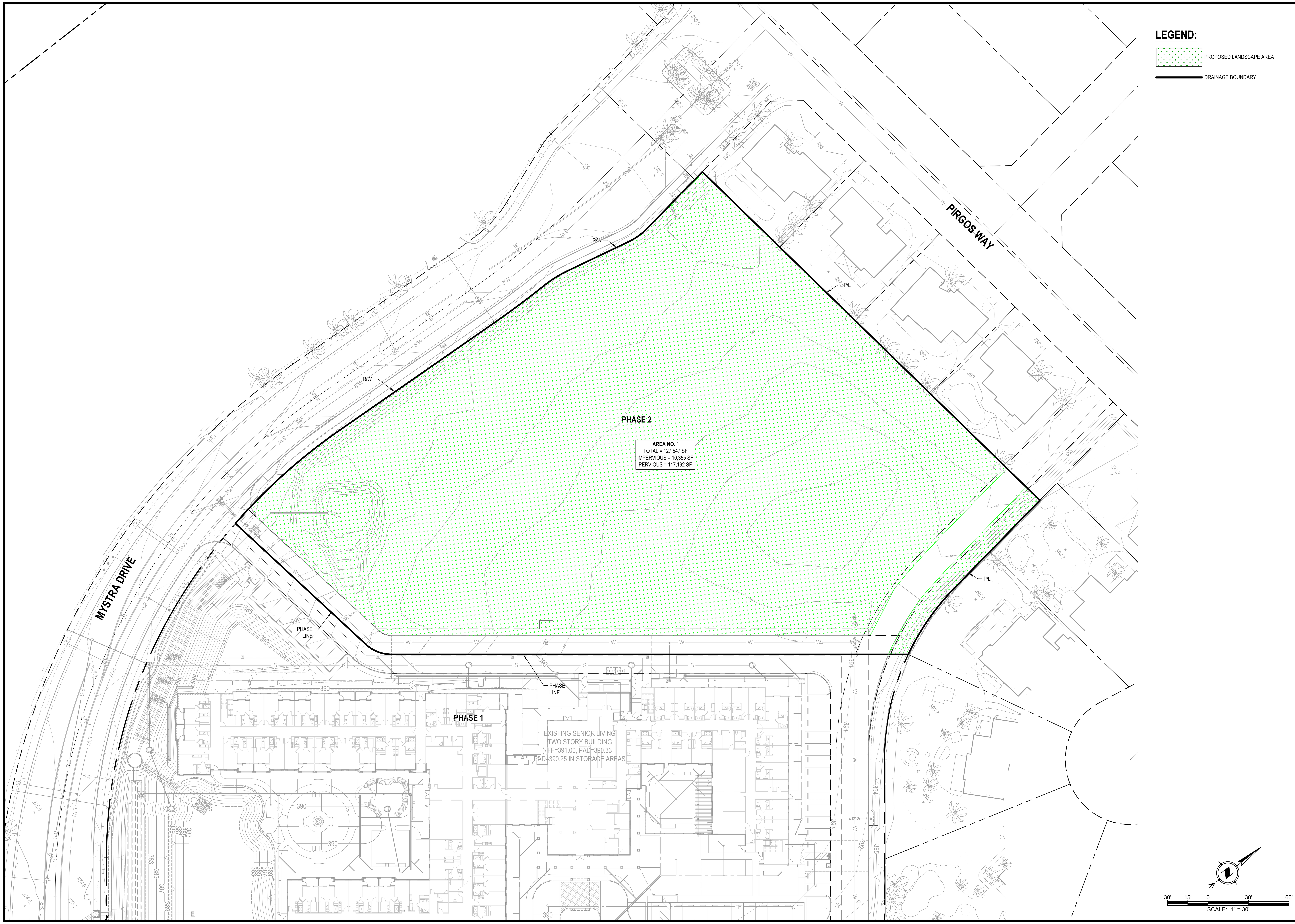
Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).

DU/A = dwelling units per acre

NRCS = National Resources Conservation Service

Appendix D –Hydrology Maps



DIG ALERT
DIAL BEFORE YOU DIG
TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REVISIONS

DATE	△	DESCRIPTION

BENCH MARK - CITY OF OCEANSIDE BENCH MARK No. E-74. A BRASS DISK STAMPED "COS BM E-74" ON TOP OF CURB AT THE EASTERLY POINT OF CURVATURE, NORTHESTERLY CURB RETURN AT CANNON ROAD AND NIGHTHAWK COURT. NGVD 1929 ELEVATION = 485.110 FEET; ADD 2.26' TO CONVERT TO NAVD 1988.

BASIS OF BEARINGS - THE CALIFORNIA COORDINATE SYSTEM - 1983 (CCS83), ZONE IV, 1991.35 EPOCH, NORTH AMERICAN DATUM OF 1983 (NAD83). GRID BEARING BETWEEN STATION V2017 AND STATION V2016 DERIVED FROM COORDINATES PUBLISHED IN THE CITY OF VISTA SURVEY CONTROL NETWORK ESTABLISHED BY RECORD OF SURVEY No. 14023, FILED IN THE OFFICE OF THE SAN DIEGO COUNTY RECORDER ON DECEMBER 23, 1992. I.E. NORTH 14°51'28.9" WEST.

REGISTERED PROFESSIONAL ENGINEER
MAHIR WABER
No. C69050
Exp. 6/30/20
CIVIL
STATE OF CALIFORNIA

Waber Consultants INC
PLANNING CIVIL ENGINEERING SURVEYING
3711 LONG BEACH BLVD, STE 1008, LONG BEACH, CA 90807
P (562) 426-8283 F (562) 372-3282

PRELIMINARY EXISTING HYDROLOGY MAP

CIVIL IMPROVEMENT PLANS
OCEAN HILLS ALF - PHASE 2

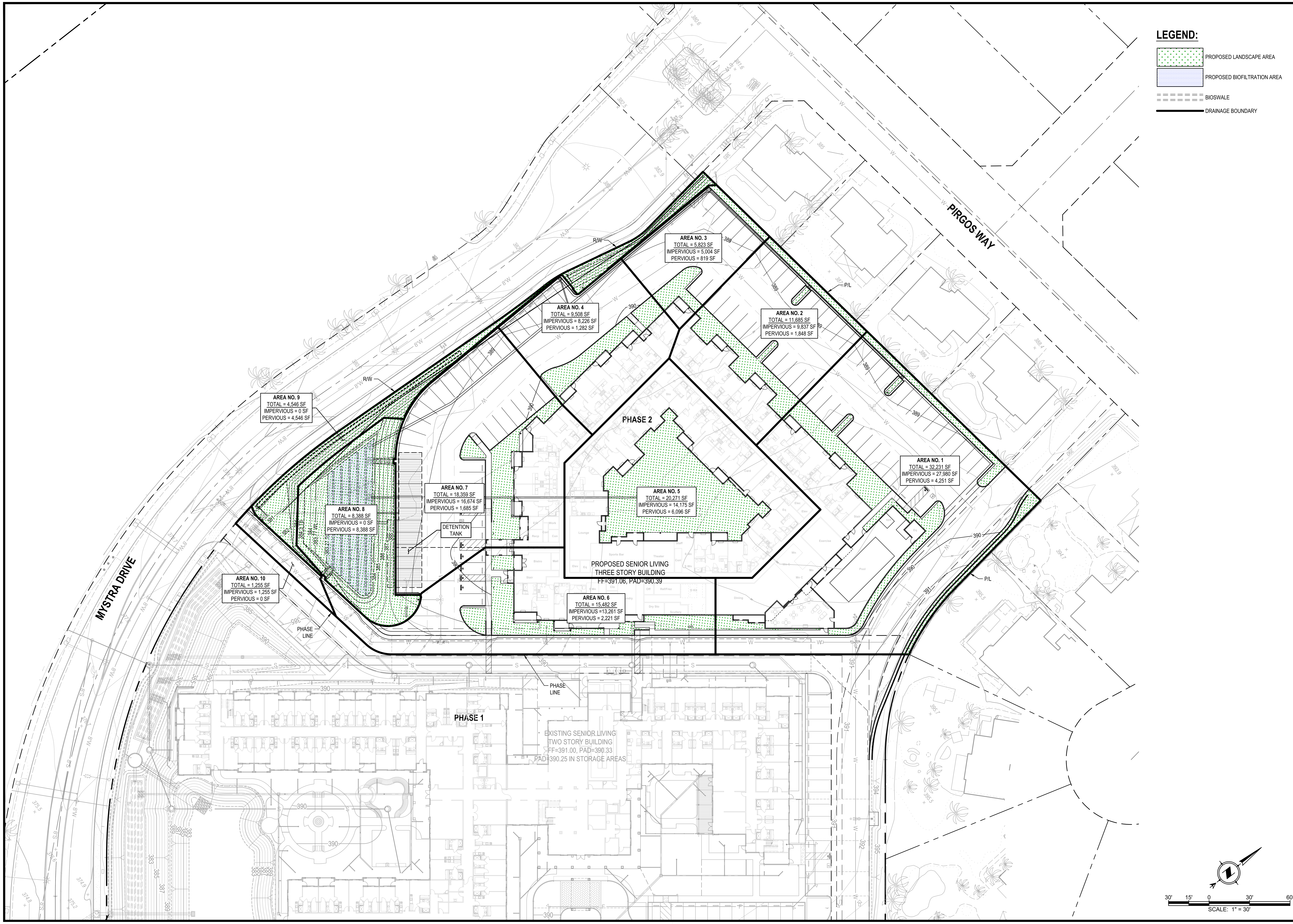
4500 CANNON ROAD
OCEANSIDE, CA 92056

JOB NO. 18045

DATE: 10/24/2018

SHEET 1 OF 2 SHEETS

W:\18-045 OCEAN HILLS ALF\DWG\18045PHD-01.dwg Oct 24, 2018 - 3:15pm



DIGALERT
DIAL BEFORE YOU DIG
TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 1-800-227-2600
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REVISIONS		
DATE	△	DESCRIPTION

BENCH MARK - CITY OF OCEANSIDE BENCH MARK No. E-74. A BRASS DISK STAMPED "COS BM E-74" ON TOP OF CURB AT THE EASTERLY POINT OF CURVATURE, NORTHESTERLY CURB RETURN AT CANNON ROAD AND NIGHTHAWK COURT. NGVD 1929 ELEVATION = 485.110 FEET; ADD 2.26' TO CONVERT TO NAVD 1988.

BASIS OF BEARINGS - THE CALIFORNIA COORDINATE SYSTEM - 1983 (CCS83), ZONE IV, 1991.35 EPOCH, NORTH AMERICAN DATUM OF 1983 (NAD83). GRID BEARING BETWEEN STATION V2017 AND STATION V2016 DERIVED FROM COORDINATES PUBLISHED IN THE CITY OF VISTA SURVEY CONTROL NETWORK ESTABLISHED BY RECORD OF SURVEY No. 14023, FILED IN THE OFFICE OF THE SAN DIEGO COUNTY RECORDER ON DECEMBER 23, 1992. I.E. NORTH 14°51'28.9" WEST.

REGISTERED PROFESSIONAL ENGINEER
MAHIR WABER
No. C69050
Exp. 6/30/20
CIVIL
STATE OF CALIFORNIA

Waber Consultants INC
PLANNING CIVIL ENGINEERING SURVEYING
3711 LONG BEACH BLVD, STE 1008, LONG BEACH, CA 90807
P (562) 426-8283 F (562) 372-3282

PRELIMINARY PROPOSED HYDROLOGY MAP

CIVIL IMPROVEMENT PLANS
OCEAN HILLS ALF - PHASE 2

4500 CANNON ROAD
OCEANSIDE, CA 92056

JOB NO. 18045
DATE: 10/24/2018
SHEET 2 OF 2 SHEETS

W:\18-045 OCEAN HILLS ALF\DWG\18045PHD-02.dwg Oct 24, 2018 - 4:02pm

Appendix E – Hydromodification Calculations

APPENDIX E

Stormwater Quality Management Plans

Development Plan (D18-00019)

Conditional Use Permit (CUP18-00023)

CITY OF OCEANSIDE

ENGINEERING DIVISION

PRIORITY DEVELOPMENT PROJECT

STORM WATER QUALITY MANAGEMENT PLAN

FOR

OCEAN HILLS ALF

ENGINEER OF WORK

MAHIR WABER, P.E. C69050

INSERT NAME OF EOW – PE NUMBER

PREPARED FOR:

PROTEA SENIOR LIVING

18 VENTANA RIDGE DR.

ALISO VIEJO, CA 92656

949-677-8795

PREPARED BY:

WABER CONSULTANTS, INC.

3711 LONG BEACH BLVD, SUITE 1008

LONG BEACH, CA 90807

562-426-8283

How to Use This Template

This template, assembled by GHD Inc. on behalf of the City of Oceanside, is for the development of Storm Water Quality Management Plans (SWQMPs) for Priority Development Projects (PDPs) proposed within Oceanside, CA. It is based on requirements set forth in the Regional Water Quality Control Board's National Pollutant Discharge Elimination System MS4 Permit that covers the San Diego Region (Order No. R9-2013-0001).

All references within the template refer to the City of Oceanside BMP Design Manual dated February 2016 (Manual). Use of this template in conjunction with the Manual is intended to help a project applicant develop a SWQMP compliant with City of Oceanside and MS4 Permit requirements.

Template Date: February 16, 2016

Assembled By:

Quick Reference Guide

Item	Project Information
Project Name	Ocean Hills ALF
Application Number(s)	Development Plan (D18-00019), Conditional Use Permit (CUP18-00023)
Project Address	4500 Cannon Road
Total Parcel Area	127,547 sq. ft.
Project Description	The existing site is approximately site is 6.46 acres and has been rough graded and is relatively flat. It slopes in a generally westerly direction into two existing drain inlets that tie-in to existing 24" pipe. The pipe ties-in to existing curb catch basin on Mystra Way. The proposed site is approximately 2.93 acres. It includes a 3-story assisted living facility, parking lot and landscape areas. It is bound by a proposed drive aisle to the south and east, Mystra Drive to the west and residential properties to the north. Parking spaces are provided along the north and west portion of the building. The site is bound by landscape areas. The stormwater runoff at site drain into storm drain system that eventually drain onto the biofiltration basin downstream. The overflow from biofiltration basin are routed to a detention basin located in the west side of the property. Overflow from the detention basin will drain into existing curb inlet catch basin in Mystra Drive to drain into the existing municipal storm drain system.
Proposed Disturbed Area	127,547 sq. ft.
Created or Replaced Impervious	96,411 sq. ft.
Project Hydrologic Unit Watershed	☐ Santa Maria ☐ San Luis Rey ☒ Carlsbad
Required to implement HMP	☒ Yes ☐ No

Table of Contents

CERTIFICATION PAGE

Project Name: Ocean Hills ALF
Permit Application Number: Development Plan (D18-00019), Conditional Use Permit (CUP18-00023)

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the City of Oceanside BMP Design Manual, which is based on the requirements of San Diego Regional Water Quality Control Board Order No. R9-2013-0001 (MS4 Permit).

I have read and understand that the City has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. I certify that this SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this SWQMP by City staff is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

As Engineer of Work, I agree to indemnify, defend, and hold harmless the City of Oceanside, its officers, agents, and employees from any and all liability, claims, damages, or injuries to any person or property which might arise from the negligent acts, errors, or omissions of the Engineer of Work, my employees, agents or consultants.

C69050 Exp. 06/30/2020

Engineer of Work's Signature, PE Number & Expiration Date

Mahir Waber, P.E.

Print Name

Waber Consultants, Inc.

Company

____

Date

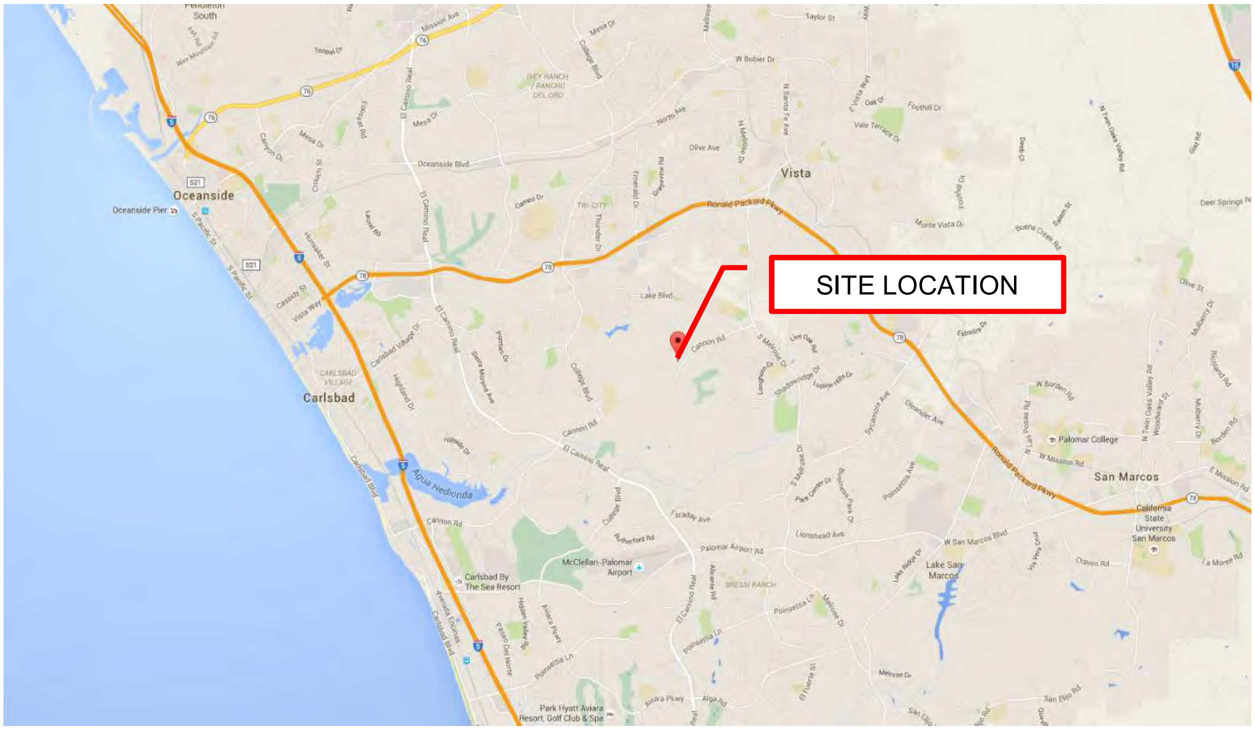
Engineer's Seal:

SUBMITTAL RECORD

Use this Table to keep a record of submittals of this SWQMP. Each time the SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments behind this page.

Submittal Number	Date	Project Status	Changes
1	10/16/18	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Initial Submittal
2	XX/XX/XX	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Second Submittal
3	XX/XX/XX	☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Third Submittal
4	XX/XX/XX	☐ Preliminary Design/ Planning/ CEQA ☒ Final Design	

Project Vicinity Map



Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)			Form I-1
Project Identification			
Project Name: Ocean Hills ALF			
Permit Application Number: Development Plan (D18-00019), Conditional Use Permit (CUP18-00023)			Date:
Determination of Requirements			
The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements. Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop". Refer to the manual sections and/or separate forms referenced in each step below.			
Step	**Answer**	**Progression**	
Step 1: Is the project a "development project"? See Section 1.3 of the manual for guidance.	☒Yes	Go to Step 2.	
	☐No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.	
Discussion / justification if the project is not a "development project" (e.g., the project includes *only* interior remodels within an existing building):			
Step 2: Is the project a Standard Project, PDP, or exception to PDP definitions? To answer this item, see Section 1.4 of the manual *in its entirety* for guidance, AND complete Form I-2, Project Type Determination.	☐Standard Project	Stop. Standard Project requirements apply, including Standard Project SWQMP.	
	☒PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.	
	☐ Exception to PDP definitions	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below. Prepare Standard Project SWQMP.	
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:			

Form I-1 Page 2 of 2		
Step	**Answer**	**Progression**
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the manual for guidance.	☐Yes	Consult the [City Engineer] to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	☒No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (*not required if prior lawful approval does not apply*):		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the manual for guidance.	☒Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	☐No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do <u>not</u> apply:		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the manual for guidance.	☐Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	☒No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does <u>not</u> apply: Site is relatively flat with average slope of approximately 1%. The surface is underlain with generally fine materials including silty sand and sandy clay. There are no critical coarse sediment yield areas to be protected based on the WMAA maps.		

Project Type Determination Checklist			Form I-2
Project Information			
Project Name: Ocean Hills ALF			
Permit Application Number: Development Plan (D18-00019), Conditional Use Permit (CUP18-00023)			
Project Type Determination: Standard Project or PDP			
The project is (select one): ■ New Development ☐ Redevelopment			
The total proposed newly created or replaced impervious area is: 96,411 ft² (2.21) acres			
Is the project in any of the following categories, (a) through (f)?			
Yes ☒	No ☐	(a)	New development projects that create 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☐	No ☒	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☒	No ☐	(c)	New and redevelopment projects that create 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption SIC code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

<table>
<tr><th colspan="4">Form I-2 Page 2 of 2</th></tr>
<tr><td>Yes
☐</td><td>No
☒</td><td>(d)</td><td>New or redevelopment projects that create or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). “Discharging directly to” includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).
Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and SDRWQCB; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and SDRWQCB; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See manual Section 1.4.2 for additional guidance.</td></tr>
<tr><td>Yes
☐</td><td>No
☒</td><td>(e)</td><td>New development projects that support one or more of the following uses:

(i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539.

(ii) Retail gasoline outlets. This category includes retail gasoline outlets that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic of 100 or more vehicles per day.</td></tr>
<tr><td>Yes
☒</td><td>No
☐</td><td>(f)</td><td>New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction.
Note: See manual Section 1.4.2 for additional guidance.</td></tr>
<tr><td colspan="4">Does the project meet the definition of one or more of the PDP categories (a) through (f) listed above?
☐ No – the project is not a PDP (Standard Project).
☒ Yes – the project is a PDP.</td></tr>
<tr><td colspan="4">The following is for redevelopment PDPs only:

The area of existing (pre-project) impervious area at the project site is: 0 ft² (A)
The total proposed newly created or replaced impervious area is: 96,411 ft² (B)
Percent impervious surface created or replaced (A/B)*100: 0 %
The percent impervious surface created or replaced is (select one based on the above calculation):
☒ less than or equal to fifty percent (50%) – only new impervious areas are considered PDP
OR
☐ greater than fifty percent (50%) – the entire project site is a PDP</td></tr>
</table>

Site Information Checklist For PDPs	Form I-3B (PDPs)

Project Summary Information	
Project Name	Ocean Hills ALF
Project Address	4500 Cannon Road
Assessor's Parcel Number(s)	169-562-01
Permit Application Number	Development Plan (D18-00019), Conditional Use Permit (CUP18-00023)
Project Watershed (Hydrologic Unit)	Select One: ☐Santa Margarita 902 ☐San Luis Rey 903 ☒Carlsbad 904
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	6.46 Acres (281,427 Square Feet)
Area to be disturbed by the project (Project Area)	2.93 Acres (127,547 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	2.21 Acres (96,411 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	0.71 Acres (31,136 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	

Hydrologic Unit	Hydrologic Area	Hydrologic Sub-Area
Santa Margarita 902.00	☐ Ysidora 902.10	☐ Lower Ysidora 902.11
San Luis Rey 903.00	☐ Lower San Luis 903.10	☐ Mission 903.11
		☐ Bonsall 903.12
Carlsbad 904.00	☐ Loma Alta 904.10	Not Applicable
	☐ Buena Vista Creek 904.20	☐ El Salto 904.21
		☐ Vista 904.22
	☒ Agua Hedionda 4.30	☒ Los Monos 904.31

Form I-3B Page 2 of 10
Description of Existing Site Condition and Drainage Patterns
Current Status of the Site (select all that apply): ☐Existing development ☒Previously graded but not built out ☐Agricultural or other non-impervious use ☐Vacant, undeveloped/natural Description / Additional Information:
Existing Land Cover Includes (select all that apply): ☐Vegetative Cover ☒Non-Vegetated Pervious Areas ☐Impervious Areas Description / Additional Information:
Underlying Soil belongs to Hydrologic Soil Group (select all that apply): ☐NRCS Type A ☐NRCS Type B ☐NRCS Type C ☒NRCS Type D
Approximate Depth to Groundwater: ☐Groundwater Depth < 5 feet ☐5 feet < Groundwater Depth < 10 feet ☐10 feet < Groundwater Depth < 20 feet ☒Groundwater Depth > 20 feet

Form I-3B Page 3 of 10
Description of Existing Site Topography and Drainage [How is storm water runoff conveyed from the site? At a minimum, this description should answer (1) whether existing drainage conveyance is natural or urban; (2) describe existing constructed storm water conveyance systems, if applicable; and (3) is runoff from offsite conveyed through the site? If so, describe]: The existing site has been rough graded and is relatively flat. It slopes in a generally westerly direction into two existing drain inlets that tie-in to existing 24" pipe. The pipe ties-in to existing curb catch basin in Mystra Way.

Form I-3B Page 4 of 10
Description of Proposed Site Development and Drainage Patterns
Project Description / Proposed Land Use and/or Activities: The project proposes a 3-story assisted living facility building, parking lot and landscape areas. It is bound by a proposed drive aisle to the south and east. Parking spaces are provided along the north and west portion of the building. The site is bound by landscape areas. The stormwater runoff at site drain into storm drain system that eventually drain onto the biofiltration basin downstream. Overflow drains in the biofiltration basins are routed to a detention basin located in the west side of the property. The overflow from the detention basin will drain into the existing curb inlet catch basin on Mystra Way to drain into the existing municipal storm drain system.
List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features): Impervious areas of the site include proposed roofs, parking spaces, sidewalks, and drive aisle.
List/describe proposed pervious features of the project (e.g., landscape areas): Pervious areas of the site include proposed landscape and biofiltration area.
Does the project include grading and changes to site topography? ☒Yes ☐No Description / Additional Information: The site is graded to maintain a similar drainage pattern. The proposed site eventually drains to the biofiltration basin located at the west side of the site. Underground detention tanks are located downstream of the biofiltration basins.

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?
☒Yes
☐No

Description / Additional Information:

The project proposed storm drain system to convey storm water runoff from drain inlets to the proposed biofiltration basin located at the west side of the site. Underground detention tank are located downstream of the biofiltration basin.

Form I-3B Page 5 of 10
Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply): ☒Onsite storm drain inlets ☒Interior floor drains and elevator shaft sump pumps ☐Interior parking garages ☒Need for future indoor & structural pest control ☒Landscape/outdoor pesticide use ☒Pools, spas, ponds, decorative fountains, and other water features ☒Food service ☐Refuse areas ☐Industrial processes ☐Outdoor storage of equipment or materials ☐Vehicle and equipment cleaning ☐Vehicle/equipment repair and maintenance ☐Fuel dispensing areas ☐Loading docks ☒Fire sprinkler test water ☒Miscellaneous drain or wash water ☒Plazas, sidewalks, and parking lots

Form I-3B Page 6 of 10		
Identification of Receiving Water Pollutants of Concern		
Describe path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable): Stormwater runoff from drains into the existing municipal storm drain system in Mystra Way. The storm drain system eventually drains into Agua Hedionda Creek and eventually into the Pacific Ocean.		
List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs for the impaired water bodies:		
303(d) Impaired Water Body	**Pollutant(s)/Stressor(s)**	**TMDLs**
Agua Hedionda Creek	Enterococcus, Fecal Coliform, Manganese, Phosphorous, Selenium, Nitrogen, Toxicity	Benthic Community Effects, Benthic-Macroinvertebrate Bioassessments, Enterococcus, Fecal Coliform, Manganese, Phosphorus, Selenium, Sulfates, Total Dissolved Solids, Total Nitrogen as N, Toxicity, Turbidity

Form I-3B Page 7 of 10			
Identification of Project Site Pollutants*			
***Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)**			
Identify pollutants expected from the project site based on all proposed use(s) of the site (see manual Appendix B.6):			
Pollutant	**Not Applicable to the Project Site**	**Expected from the Project Site**	**Also a Receiving Water Pollutant of Concern**
Sediment			
Nutrients			
Heavy Metals			
Organic Compounds			
Trash & Debris			
Oxygen Demanding Substances			
Oil & Grease			
Bacteria & Viruses			
Pesticides			

Note: Indicator Bacteria shall be addressed as a Pollutant of Concern (POC) for projects located in the Lower San Luis Hydrologic Area and for projects that discharge to the Pacific Ocean Shoreline within the boundaries of the City of Oceanside.

Note: Nutrients shall be addressed as a Pollutant of Concern (POC) for projects located in the Loma Alta Hydrologic Area.

Form I-3B Page 8 of 10
Hydromodification Management Requirements
Do hydromodification management requirements apply (see Section 1.6 of the manual)? ☒Yes, hydromodification management flow control structural BMPs required. ☐No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean. ☐No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean. ☐No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides. Description / Additional Information (to be provided if a 'No' answer has been selected above):
Critical Coarse Sediment Yield Areas* ***This Section only required if hydromodification management requirements apply**
Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries? ☐Yes ☒No, no critical coarse sediment yield areas to be protected based on WMAA maps If yes, have any of the optional analyses presented in Section 6.2 of the manual been performed? ☐6.2.1 Verification of GLUs Onsite ☐6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite ☐No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps If optional analyses were performed, what is the final result? ☐No critical coarse sediment yield areas to be protected based on verification of GLUs onsite. ☐Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 8 of the SWQMP. ☐Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit. Discussion / Additional Information:

Form I-3B Page 9 of 10
Flow Control for Post-Project Runoff* ***This Section only required if hydromodification management requirements apply**
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit. POC for hydromodification management is provided upstream of the existing curb inlet catch basin and is indicated on Hydromodification Management Exhibit.
Has a geomorphic assessment been performed for the receiving channel(s)? ☒No, the low flow threshold is 0.1Q2 (default low flow threshold) ☐Yes, the result is the low flow threshold is 0.1Q2 ☐Yes, the result is the low flow threshold is 0.3Q2 ☐Yes, the result is the low flow threshold is 0.5Q2 If a geomorphic assessment has been performed, provide title, date, and preparer: Discussion / Additional Information: (optional)

Form I-3B Page 10 of 10
Other Site Requirements and Constraints
When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements. N/A
Optional Additional Information or Continuation of Previous Sections As Needed
This space provided for additional information or continuation of information from previous sections as needed.

Source Control BMP Checklist for All Development Projects (Standard Projects and PDPs)			Form I-4
Project Identification			
Project Name: Ocean Hills ALF			
Permit Application Number: Development Plan (D18-00019), Conditional Use Permit (CUP18-00023)			
Source Control BMPs			
All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the manual for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.			
Source Control Requirement	**Implemented?**		
SC-1 Prevention of Illicit Discharges into the MS4	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-1 not implemented:			
SC-2 Storm Drain Stenciling or Signage	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented:			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-3 not implemented:			

Form I-4 Page 2 of 3			
Source Control Requirement	**Implemented?**		
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-4 not implemented:			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-5 not implemented:			

Form I-4 Page 3 of 3			
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)	**Implemented?**		
Onsite storm drain inlets	☒ Yes	☐ No	☐ N/A
Interior floor drains and elevator shaft sump pumps	☒ Yes	☐ No	☐ N/A
Interior parking garages	☐ Yes	☐ No	☒ N/A
Need for future indoor & structural pest control	☒ Yes	☐ No	☐ N/A
Landscape/outdoor pesticide use	☒ Yes	☐ No	☐ N/A
Pools, spas, ponds, decorative fountains, and other water features	☒ Yes	☐ No	☐ N/A
Food service	☒ Yes	☐ No	☐ N/A
Refuse area	☒ Yes	☐ No	☐ N/A
Industrial processes	☐ Yes	☐ No	☒ N/A
Outdoor storage of equipment or materials	☐ Yes	☐ No	☒ N/A
Vehicle and equipment cleaning	☐ Yes	☐ No	☒ N/A
Vehicle/equipment repair and maintenance	☐ Yes	☐ No	☒ N/A
Fuel dispensing areas	☐ Yes	☐ No	☒ N/A
Loading docks	☐ Yes	☐ No	☒ N/A
Fire sprinkler test water	☒ Yes	☐ No	☐ N/A
Miscellaneous drain or wash water	☒ Yes	☐ No	☐ N/A
Plazas, sidewalks, and parking lots	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.			

E.1 Source Control BMP Requirements

Worksheet E.1-1: Source Control BMP Requirements

How to comply: Projects shall comply with this requirement by implementing all source control BMPs listed in this section that are applicable to their project. Applicability shall be determined through consideration of the development project's features and anticipated pollutant sources. Appendix E.1 provides guidance for identifying source control BMPs applicable to a project. Checklist I.4 in Appendix I shall be used to document compliance with source control BMP requirements.

How to use this worksheet:

1. Review Column 1 and identify which of these potential sources of storm water pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your project site plan.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in a table in your project-specific storm water management report. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternatives.

If These Sources Will Be on the Project Site …	… Then Your SWQMP Shall Consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☑ **A.** Onsite storm drain inlets ❑ Not Applicable	☑ Locations of inlets.	☑ Mark all inlets with the words "No Dumping! Flows to Bay" or similar.	☑ Maintain and periodically repaint or replace inlet markings. ☑ Provide storm water pollution prevention information to new site owners, lessees, or operators. ☑ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. ☑ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☑ **B.** Interior floor drains and elevator shaft sump pumps ❑ Not Applicable		☑ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☑ Inspect and maintain drains to prevent blockages and overflow.
❑ **C.** Interior parking garages ☑ Not Applicable		❑ State that parking garage floor drains will be plumbed to the sanitary sewer.	❑ Inspect and maintain drains to prevent blockages and overflow.
☑ **D1.** Need for future indoor & structural pest control ❑ Not Applicable		☑ Note building design features that discourage entry of pests.	☑ Provide Integrated Pest Management information to owners, lessees, and operators.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☑ **D2.** Landscape/ Outdoor Pesticide Use ❑ Not Applicable	☑ Show locations of existing trees or areas of shrubs and ground cover to be undisturbed and retained. ☑ Show self-retaining landscape areas, if any. ☑ Show storm water treatment facilities.	State that final landscape plans will accomplish all of the following. ☑ Preserve existing drought tolerant trees, shrubs, and ground cover to the maximum extent possible. ☑ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution. ☑ Where landscaped areas are used to retain or detain storm water, specify plants that are tolerant of periodic saturated soil conditions. ☑ Consider using pest-resistant plants, especially adjacent to hardscape. ☑ To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☑ Maintain landscaping using minimum or no pesticides. ☑ See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com. ☑ Provide IPM information to new owners, lessees and operators.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☑ **E.** Pools, spas, ponds, decorative fountains, and other water features. ❑ Not Applicable	☑ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet.	☑ If the City requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to City requirements.	☑ See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.
☑ **F.** Food service ❑ Not Applicable	☑ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ❑ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	❑ Describe the location and features of the designated cleaning area. ❑ Describe the items to be cleaned in this facility and how it has been sized to ensure that the largest items can be accommodated.	

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☑ **G.** Refuse areas ❑ Not Applicable	☑ Show where site refuse and recycled materials will be handled and stored for pickup. See City requirements for sizes and other details of refuse areas. ☑ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run- on and show locations of berms to prevent runoff from the area. Also show how the designated area will be protected from wind dispersal. ☑ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	☑ State how site refuse will be handled and provide supporting detail to what is shown on plans. ☑ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	☑ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative Table and Narrative**
❑ **H.** Industrial processes. ☑ Not Applicable	❑ Show process area.	❑ If industrial processes are to be located onsite, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	❑ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.) ☑ Not Applicable	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or runoff from area and protected from wind dispersal. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	❑ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release Prevention Program ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
❑ **J.** Vehicle and Equipment Cleaning ☑ Not Applicable	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle /equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited onsite and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe measures taken to discourage onsite car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. ❑ Car dealerships and similar may rinse cars with water only. ❑ See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
❑ **K.** Vehicle/Equipment Repair and Maintenance ✓ Not Applicable	❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to protect from rainfall, run-on runoff, and wind dispersal. ❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the report, note that all of the following restrictions apply to use the site: ❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
❑ **L.** Fuel Dispensing Areas ☑ Not Applicable	❑ Fueling areas[1] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are (1) graded at the minimum slope necessary to prevent ponding; and (2) separated from the rest of the site by a grade break that prevents run-on of storm water to the MEP. ❑ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area1.] The canopy [or cover] shall not drain onto the fueling area.		❑ The property owner shall dry sweep the fueling area routinely. ❑ See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

1. The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
M. Loading Docks ☑ Not Applicable	❑ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct storm water away from the loading area. Water from loading dock areas should be drained to the sanitary sewer where feasible. Direct connections to storm drains from depressed loading docks are prohibited. ❑ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ❑ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		❑ Move loaded and unloaded items indoors as soon as possible. ❑ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 Potential Sources of Runoff Pollutants	**2 Permanent Controls—Show on Drawings**	**3 Permanent Controls—List in Table and Narrative**	**4 Operational BMPs—Include in Table and Narrative**
☑ **N.** Fire Sprinkler Test Water ❑ Not Applicable		☑ Provide a means to drain fire sprinkler test water to the sanitary sewer.	☑ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com.
O. Miscellaneous Drain or Wash Water ❑ Boiler drain lines ❑ Condensate drain lines ❑ Rooftop equipment ❑ Drainage sumps ☑ Roofing, gutters, and trim ❑ Not Applicable		❑ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ❑ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ❑ Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ❑ Any drainage sumps onsite shall feature a sediment sump to reduce the quantity of sediment in pumped water. ☑ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	

If These Sources Will Be on the Project Site …	… Then Your SWQMP shall consider These Source Control BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Drawings**	**3** **Permanent Controls—List in Table and Narrative**	**4** **Operational BMPs—Include in Table and Narrative**
☑ **P.** Plazas, sidewalks, and parking lots. ❑ Not Applicable			☑ Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

Site Design BMP Checklist for All Development Projects (Standard Projects and PDPs)			Form I-5
Project Identification			
Project Name: Ocean Hills ALF			
Permit Application Number: Development Plan (D18-00019), Conditional Use Permit (CUP18-00023)			
Site Design BMPs			
All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the manual for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.			
Site Design Requirement	**Applied?**		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-1 not implemented:			
SD-2 Conserve Natural Areas, Soils, and Vegetation	☐ Yes	☒ No	☐ N/A
Discussion / justification if SD-2 not implemented: Existing site has little vegetative cover. There are no sensitive areas at existing site.			
SD-3 Minimize Impervious Area	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented:			

Form I-5 Page 2 of 2			
Site Design Requirement	**Applied?**		
SD-5 Impervious Area Dispersion	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-5 not implemented:			
SD-6 Runoff Collection	☐ Yes	☒ No	☐ N/A
Discussion / justification if SD-6 not implemented: Green roofs or permeable pavements are not implemented in this project. All runoff will sheet flow and be collected by the proposed drain inlets.			
SD-7 Landscaping with Native or Drought Tolerant Species	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☐ Yes	☒ No	☐ N/A
Discussion / justification if SD-8 not implemented: Harvest and use is infeasible per Form I-7. Stormwater runoff will be eventually drain onto the biofiltration basin and then routed to a detention basin.			

Summary of PDP Structural BMPs	Form I-6 (PDPs)
Project Identification	
Project Name: Ocean Hills ALF	
Permit Application Number: Development Plan (D18-00019), Conditional Use Permit (CUP18-00023)	
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s). PDP structural BMPs must be verified by the local jurisdiction at the completion of construction. This may include requiring the project owner or project owner's representative to certify construction of the structural BMPs (see Section 1.12 of the manual). PDP structural BMPs must be maintained into perpetuity, and the local jurisdiction must confirm the maintenance (see Section 7 of the manual). Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).	
Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate. DCV for entire site was calculated. Performed feasibility analysis for harvest. Determined harvest is infeasible due to low demand. Performed feasibility analysis for infiltration. Determined infiltration is infeasible due to shallow bedrock. Evaluated BMP footprint required for biofiltration and strategically located BMP at downstream end of property. (Continue on page 2 as necessary.)	

Form I-6 Page 2 of 4
(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)
(Continued from page 1)

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**	
Structural BMP ID No. Basin #1	
Construction Plan Sheet No.	
Type of structural BMP: ☐Retention by harvest and use (HU-1) ☐Retention by infiltration basin (INF-1) ☐Retention by bioretention (INF-2) ☐Retention by permeable pavement (INF-3) ☐Partial retention by biofiltration with partial retention (PR-1) ☒Biofiltration (BF-1) ☐Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐Detention pond or vault for hydromodification management ☐Other (describe in discussion section below)	
Purpose: ☒Pollutant control only ☐Hydromodification control only ☐Combined pollutant control and hydromodification control ☐Pre-treatment/forebay for another structural BMP ☐Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the manual)	Mahir Waber Waber Consultants, Inc. (562) 426-8283
Who will be the final owner of this BMP?	Ocean Hills ALF
Who will maintain this BMP into perpetuity?	Ocean Hills ALF
What is the funding mechanism for maintenance?	Ocean Hills ALF to fund maintenance of the site BMPs.
Form I-6 Page 3 of X (Copy as many as needed)	

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information (Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. Tank #1	
Construction Plan Sheet No.	
Type of structural BMP: ☐Retention by harvest and use (HU-1) ☐Retention by infiltration basin (INF-1) ☐Retention by bioretention (INF-2) ☐Retention by permeable pavement (INF-3) ☐Partial retention by biofiltration with partial retention (PR-1) ☐Biofiltration (BF-1) ☐Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☒Detention pond or vault for hydromodification management ☐Other (describe in discussion section below)	
Purpose: ☐Pollutant control only ☒Hydromodification control only ☐Combined pollutant control and hydromodification control ☐Pre-treatment/forebay for another structural BMP ☐Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the [City Engineer] (See Section 1.12 of the manual)	Mahir Waber Waber Consultants, Inc. (562) 426-8283
Who will be the final owner of this BMP?	Ocean Hills ALF
Who will maintain this BMP into perpetuity?	Ocean Hills ALF
What is the funding mechanism for maintenance?	Ocean Hills ALF to fund maintenance of the site BMPs.

Form I-6 Page 4 of X (Copy as many needed)
Structural BMP Summary Information **(Copy this page as needed to provide information for each individual proposed structural BMP)**
Discussion (as needed):

	City of Oceanside 300 N Coast Highway Oceanside, CA 92054	**Permanent BMP Construction** **Self Certification Form**	February 2016

Date Prepared: Click here to enter text.	Project No.: Click here to enter text.
Project Applicant: Click here to enter text.	Phone: Click here to enter text.
Project Address: Click here to enter text.	
Project Engineer: Click here to enter text.	Phone: Click here to enter text.

The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Storm Water Quality Management Plan (SWQMP) documents and drawings.

This form must be completed by the engineer and installing contractor and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for all new development and redevelopment projects in order to comply with the City's Storm Water ordinances and NDPES Permit Order No. R9-2013-0001. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of Oceanside.

ENGINEER'S CERTIFICATION:

As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control and treatment control BMP's required per the approved SWQMP and Construction Permit No. Click here to enter text.; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and Order No. R9-2013-0001 of the San Diego Regional Water Quality Control Board.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: ______________________________

Date of Signature: _ Click here to enter text.__

Printed Name: _ Click here to enter text._____

Title: _ Click here to enter text._____________

Phone No. _ Click here to enter text. _________

Engineer's Stamp

CONTRACTOR'S CERTIFICATION:

As the professional in responsible charge for construction of the above project, I certify that all constructed Low Impact Development (LID) site design, source control and treatment control BMP's required per the approved SWQMP and Construction Permit No. Click here to enter text.; have been constructed in compliance with the approved plans and all applicable specifications, permits, and ordinances.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: ______________________________

Date of Signature: _ Click here to enter text.__

Printed Name: _ Click here to enter text._____

Title: _ Click here to enter text._____________

Phone No. _ Click here to enter text. _________

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	☒Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	☒Included on DMA Exhibit in Attachment 1a ☐Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Design Capture Volume Worksheet	☒Included
Attachment 1d	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	☒Included ☐Not included because the entire project will use infiltration BMPs
Attachment 1e	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	☒Included ☐Not included because the entire project will use harvest and use BMPs
Attachment 1f	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines	☒Included

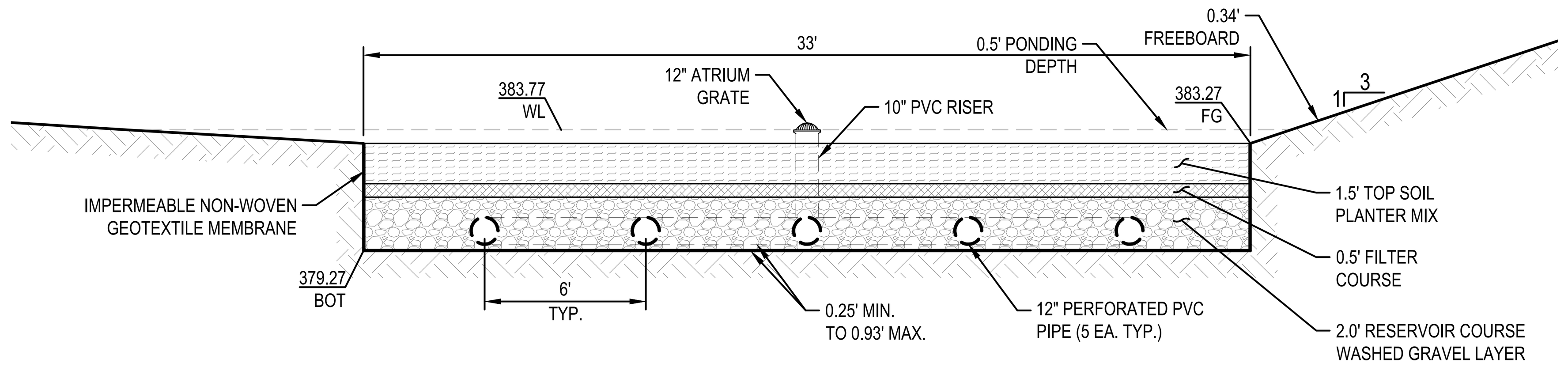
Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

☒Underlying hydrologic soil group
☒Approximate depth to groundwater
☒Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☒Critical coarse sediment yield areas to be protected
☒Existing topography and impervious areas
☒Existing and proposed site drainage network and connections to drainage offsite
☒Proposed grading
☒Proposed impervious features
☒Proposed design features and surface treatments used to minimize imperviousness
☒Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
☒Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
☒Structural BMPs (identify location, type of BMP, and size/detail)

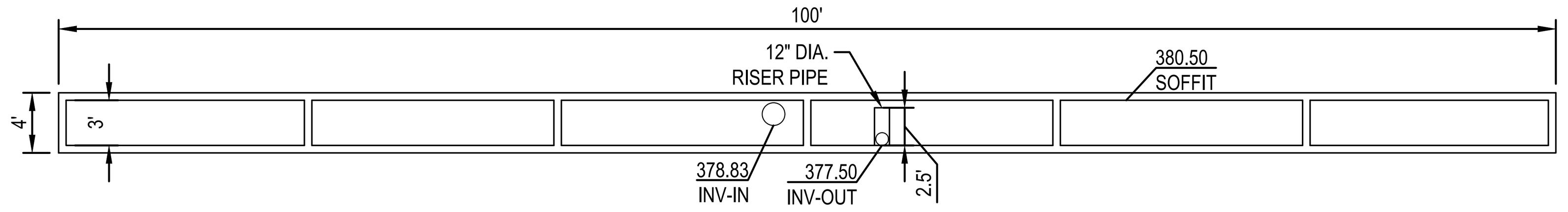
Placeholder – **DMA Exhibit**

Please provide the Exhibit in 24”x36” format with map pocket, wet stamp, and date.



BIOFILTRATION BASIN DETAIL

SCALE: 1" = 5'



DETENTION TANK DETAIL

SCALE: 1" = 5'

NOTES:

1. MEDIA IS A MINIMUM 18 INCHES DEEP, MEETING COUNTY OF SAN DIEGO LOW IMPACT DEVELOPMENT HANDBOOK: APPENDIX G - BIORETENTION SOIL SPECIFICATION (JUNE 2014, UNLESS SUPERSEDED BY MORE RECENT EDITION).

BSM COMPOSITION	SAND	SANDY LOAM			COMPOST
		SAND	SILT	CLAY	
VOLUME	65%	20%			15%
WEIGHT	75-80%		10% MAX.	3% MAX.	9% MAX.[1]

[1] 9% COMPOST BY WEIGHT RESULTS IN APPROXIMATELY 5% ORGANIC MATTER BY WEIGHT.

2. CLASS 2 PERMEABLE PER CALTRANS SPECIFICATION 68-1.025 IS RECOMMENDED FOR THE STORAGE LAYER. WASHED, OPEN-GRADED CRUSHED ROCK MAY BE USED, HOWEVER A 4-6 INCH WASHED PEA GRAVEL FILTER COURSE LAYER AT THE TOP OF THE CRUSHED ROCK IS REQUIRED.
3. UNDERDRAINS ARE MADE OF SLOTTED, PVC PIPE CONFORMING TO ASTM D 3034 OR EQUIVALENT OR CORRUGATED, HDPE PIPE CONFORMING TO AASHTO 252M OR EQUIVALENT.

BASIN CALCULATIONS

TOTAL AREA	PERVIOUS AREA	BUILDING AREA	IMPERVIOUS AREA	REQUIRED BASIN AREA	PROVIDED BASIN AREA
127,547 SF	31,680 SF	37,618 SF	58,249 SF	3,000 SF	3,096 SF

HYDROLOGIC SOIL TYPE:

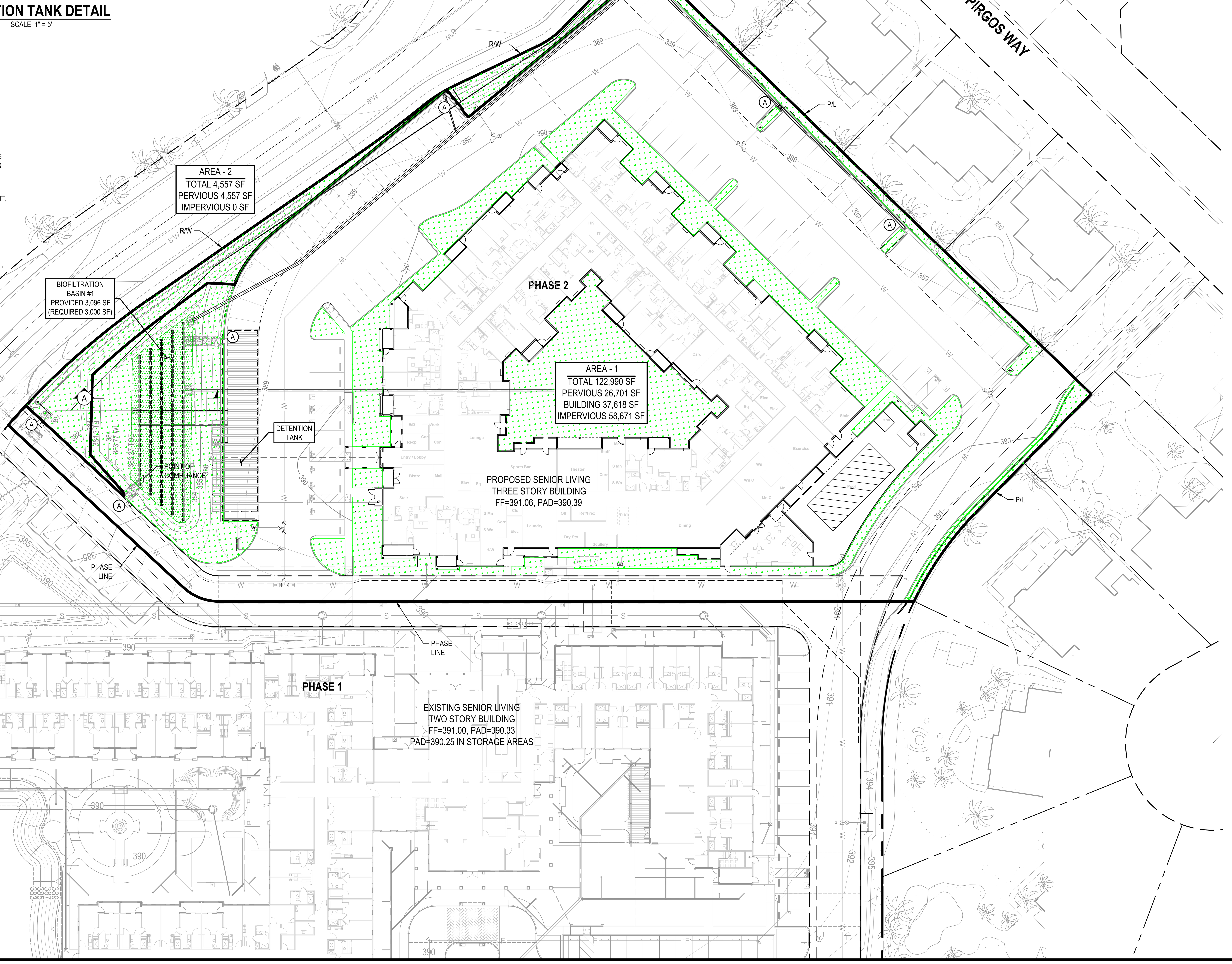
UNDERLYING SOIL BELONGS TO HYDROLOGIC SOIL GROUP, NRCS TYPE D.

NOTE:

SOURCE CONTROL BMPS AND IMPLEMENTATION ARE PROVIDED IN FORM I-4, APPENDIX E.1 IN THE SWQMP REPORT.

SITE DESIGN BMPS AND IMPLEMENTATION ARE PROVIDED IN FORM I-5 IN THE SWQMP REPORT.

AREA - 2 IS SELF-MITIGATING AREA.



LEGEND:

- PROPOSED LANDSCAPE AREA
- PROPOSED BIOFILTRATION AREA
- BIOSWALE
- DRAINAGE BOUNDARY
- (A) "NO DUMPING" TILES OR IMPRINTS
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- DRAIN INLET
- POOL
- FIRE HYDRANT

TILE OR IMPRINT AT DRAIN INLET

30' 15' 0 30' 60'

SCALE: 1" = 30'

DIG ALERT — DIAL BEFORE YOU DIG — TWO WORKING DAYS BEFORE YOU DIG — TOLL FREE 1-800-227-2600 — A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REVISIONS

DATE	△	DESCRIPTION

BENCH MARK - CITY OF OCEANSIDE BENCH MARK No. E-74. A BRASS DISK STAMPED "COS BM E-74" ON TOP OF CURB AT THE EASTERLY POINT OF CURVATURE, NORTHESTERLY CURB RETURN AT CANNON ROAD AND NIGHTHAWK COURT. NGVD 1929 ELEVATION = 485.110 FEET; ADD 2.26' TO CONVERT TO NAVD 1988.

BASIS OF BEARINGS - THE CALIFORNIA COORDINATE SYSTEM - 1983 (CCS83), ZONE IV, 1991.35 EPOCH, NORTH AMERICAN DATUM OF 1983 (NAD83). GRID BEARING BETWEEN STATION V2017 AND STATION V2016 DERIVED FROM COORDINATES PUBLISHED IN THE CITY OF VISTA SURVEY CONTROL NETWORK ESTABLISHED BY RECORD OF SURVEY No. 14023, FILED IN THE OFFICE OF THE SAN DIEGO COUNTY RECORDER ON DECEMBER 23, 1992. I.E. NORTH 14°51'28.9" WEST.

REGISTERED PROFESSIONAL ENGINEER — MAHIR WABER — No. C69050 — Exp. 6/30/20 — CIVIL — STATE OF CALIFORNIA

Waber Consultants INC
PLANNING CIVIL ENGINEERING SURVEYING
3711 LONG BEACH BLVD, STE 1008, LONG BEACH, CA 90807
P (562) 426-8283 F (562) 372-3282

PRELIMINARY SWQMP SITE PLAN

CIVIL IMPROVEMENT PLANS

OCEAN HILLS SENIOR LIVING FACILITY - PHASE 2

4500 CANNON ROAD, OCEANSIDE, CA 92056

JOB NO. 18045

DATE: 1/22/2019

SHEET 1 OF 2 SHEETS

W:\18-045 OCEAN HILLS ALF\DWG\18045EH1SWQMP.dwg Jan 22, 2019 - 3:10pm

Placeholder – **Tabular Summary of DMAs (if separate from DMA Exhibit)**

Leave placeholder intact if not applicable.

☒Not Applicable – Tabular Summary included on DMA Exhibit

	Design Capture Volume	Worksheet B-2.1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.64	inches
2	Area tributary to BMP (s)	A=	2.93	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.75	unitless
4	Street trees volume reduction	TCV=		cubic-feet
5	Rain barrels volume reduction	RCV=		cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	5,105	cubic-feet

Area Weighted Runoff Factor: $C = (\sum C_x A_x) / \sum A_x$

Where: C_x = Runoff factor for area X ; A_x = Tributary area X (acres)

$C_{ROOF} = 0.90$; $C_{SOIL} = 0.30$; $C_{HARDSCAPE} = 0.90$

A_{ROOF} = 37,618 SF ; A_{SOIL} = 31,258 SF ; $A_{HARDSCAPE}$ = 58,671 SF

$C = [(C_{ROOF} * A_{ROOF}) + (C_{SOIL} * A_{SOIL}) + (C_{HARDSCAPE} * A_{HARDSCAPE})] / (A_{ROOF} + A_{SOIL} + A_{HARDSCAPE})$

C = [(0.90 * 37,618 SF) + (0.30 * 31,258 SF) + (0.90 * 58,671 SF)] / (37,618 SF + 31,258 SF + 58,671 SF)

C = 0.75

Automated Worksheet B.3-1: Project-Scale BMP Feasibility Analysis (V1.1)

Category	#	Description	Value	Units
Capture & Use Inputs	0	Design Capture Volume for Entire Project Site	5,105	cubic-feet
	1	Proposed Development Type	Residential	unitless
	2	Number of Residents or Employees at Proposed Development	123	#
	3	Total Planted Area within Development	31,258	sq-ft
	4	Water Use Category for Proposed Planted Areas	Low	unitless
Infiltration Inputs	5	Is Average Site Infiltration Rate Less than 0.5 Inches per Hour?	Yes	yes/no
	6	Is Retention of the Full DCV Anticipated to Produce Negative Impacts?	Yes	yes/no
	7	Is Retention of Any Volume Anticipated to Produce Negative Impacts?	Yes	yes/no
Calculations	8	36-Hour Toilet Use Per Resident or Employee	0.37	cubic-feet
	9	Subtotal: Anticipated 36 Hour Toilet Use	46	cubic-feet
	10	Anticipated 1 Acre Landscape Use Over 36 Hours	52.14	cubic-feet
	11	Subtotal: Anticipated Landscape Use Over 36 Hours	37	cubic-feet
	12	Total Anticipated Use Over 36 Hours	83	cubic-feet
	13	Total Anticipated Use / Design Capture Volume	0.02	cubic-feet
	14	Are Full Capture and Use Techniques Feasible for this Project?	No	unitless
	15	Is Full Retention Feasible for this Project?	No	yes/no
	16	Is Partial Retention Feasible for this Project?	No	yes/no
Result	17	Feasibility Category	5	1, 2, 3, 4, 5

Worksheet B.3-1 General Notes:

A. Applicants may use this optional worksheet to gauge the feasibility of implementing capture and use techniques on their project site. User input should be provided for yellow shaded cells, values for all other cells will be automatically generated. Projects demonstrating feasibility or potential feasibility via this worksheet are encouraged to incorporate capture and use features in their project.

Automated Worksheet B.1-1: Calculation of Design Capture Volume (V1.1)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	1	2	3	4	5	6	7	8	9	10	unitless
	1	Basin Drains to the Following BMP Type	Biofiltration										unitless
	2	85th Percentile 24-hr Storm Depth	0.64										inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	96,289										sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)											sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)											sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)	31,258										sq-ft
Dispersion, Tree Well, & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Final Adjusted Runoff Factor Calculations	22	Total Area Tributary to BMP	127,547	0	0	0	0	0	0	0	0	0	sq-ft
	23	Composite Runoff Factor for Standard Drainage Areas	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	24	Initial Composite Runoff Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	25	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	26	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	27	Dispersed Impervious Area / Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	28	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	29	Final Adjusted Tributary Runoff Factor	0.75	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
Volume Reduction Calculations	30	Final Effective Tributary Area	95,660	0	0	0	0	0	0	0	0	0	sq-ft
	31	Initial Design Capture Volume	5,102	0	0	0	0	0	0	0	0	0	cubic-feet
	32	Volume Reduction per Tree Well	0	0	0	0	0	0	0	0	0	0	cubic-feet
	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Result	35	Design Capture Volume Tributary to BMP	5,102	0	0	0	0	0	0	0	0	0	cubic-feet

Worksheet B.1-1 General Notes:

A. Applicants may use this worksheet to calculate design capture volumes for up to 10 drainage areas User input must be provided for yellow shaded cells, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. Upon completion of this worksheet, proceed to the appropriate BMP Sizing worksheet(s).

B. Impervious surfaces include roofs, concrete, asphalt, or pervious pavements with an impervious liner. Semi-pervious surfaces include decomposed granite, cobbles, crushed aggregate, or compacted soils such as unpaved parking. Engineered pervious surfaces include pervious pavements providing full retention of the 85th percentile rainfall depth, or areas with soils that have been amended and mulched per Section 86.709 of the Landscape Ordinance. Dispersion areas are pervious or semi-pervious surfaces that receive runoff from impervious surfaces (C=0.90) and reduce stormwater runoff as outlined in Fact Sheet SD-B.

Automated Worksheet B.4-1: Sizing Infiltration-Only BMPs (V1.1)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	0	Drainage Basin ID or Name	-	-	-	-	-	-	-	-	-	-	unitless
	1	Design Capture Volume Tributary to BMP	-	-	-	-	-	-	-	-	-	-	cubic-feet
	2	Provided Infiltration Surface Area											sq-ft
	3	Provided Surface Ponding Depth											inches
	4	Provided Soil Media Thickness											inches
	5	Provided Gravel Storage Thickness											inches
	6	Native Soil Infiltration Rate											in/hr
Infiltration Calculations	7	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	8	Soil Media Pore Space	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	9	Gravel Pore Space	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	10	Effective Depth of Infiltration Storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	inches
	11	Drawdown Time for Surface Ponding (Post-Storm)	0	0	0	0	0	0	0	0	0	0	hours
	12	Drawdown Time for Entire Infiltration Basin (Including 6 Hour Storm)	0	0	0	0	0	0	0	0	0	0	hours
	13	Volume Infiltrated by BMP	0	0	0	0	0	0	0	0	0	0	cubic-feet
	14	Fraction of DCV Infiltrated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	15	Percentage of Performance Requirement Satisfied	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	16	**Deficit of Effectively Treated Stormwater**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

Worksheet B.4-1 General Notes:

A. Applicants may use this worksheet to size Infiltration-Only BMPs (INF-1) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

Automated Worksheet B.4-2: Sizing Bioretention BMPs (V1.1)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	0	Drainage Basin ID or Name	-	-	-	-	-	-	-	-	-	-	unitless
	1	Design Capture Volume Tributary to BMP	-	-	-	-	-	-	-	-	-	-	cubic-feet
	2	Provided Bioretention Surface Area											sq-ft
	3	Provided Surface Ponding Depth											inches
	4	Provided Soil Media Thickness											inches
	5	Provided Gravel Storage Thickness											inches
	6	Native Soil Infiltration Rate											in/hr
Retention Calculations	7	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	8	Soil Media Pore Space	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	unitless
	9	Gravel Pore Space	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	10	Effective Depth of Retention Storage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	11	Drawdown Time for Surface Ponding (Post-Storm)	0	0	0	0	0	0	0	0	0	0	hours
	12	Drawdown Time for Entire Bioretention Basin (Including 6 Hour Storm)	0	0	0	0	0	0	0	0	0	0	hours
	13	Volume Retained by BMP	0	0	0	0	0	0	0	0	0	0	cubic-feet
	14	Fraction of DCV Retained	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	15	Percentage of Performance Requirement Satisfied	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	16	**Deficit of Effectively Treated Stormwater**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

Worksheet B.4-2 General Notes:

A. Applicants may use this worksheet to size Bioretention BMPs (INF-2) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

Automated Worksheet B.5-1: Sizing Biofiltration BMPs (V1.1)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	0	Drainage Basin ID or Name	1	-	-	-	-	-	-	-	-	-	unitless
	1	Effective Tributary Area	95,660	-	-	-	-	-	-	-	-	-	sq-ft
	2	Minimum Biofiltration Footprint Sizing Factor	0.030	-	-	-	-	-	-	-	-	-	ratio
	3	Design Capture Volume Tributary to BMP	5,102	-	-	-	-	-	-	-	-	-	cubic-feet
	4	Provided Biofiltration Surface Area	3,000										sq-ft
	5	Provided Surface Ponding Depth	6										inches
	6	Provided Soil Media Thickness	18										inches
	7	Provided Gravel Storage Thickness	18										inches
	8	Hydromodification Orifice Diameter of Underdrain	n/a										inches
Biofiltration Calculations	9	Max Hydromod Flow Rate through Underdrain	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	CFS
	10	Max Soil Filtration Rate Allowed by Underdrain Orifice	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	in/hr
	11	Soil Media Filtration Rate	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	12	Soil Media Filtration Rate to be used for Sizing	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	13	Depth Biofiltered Over 6 Hour Storm	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	14	Soil Media Pore Space	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	unitless
	15	Gravel Pore Space	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	16	Effective Depth of Biofiltration Storage	18.6	0	0	0	0	0	0	0	0	0	inches
	17	Drawdown Time for Surface Ponding	1	0	0	0	0	0	0	0	0	0	hours
	18	Drawdown Time for Entire Biofiltration Basin	4	0	0	0	0	0	0	0	0	0	hours
	19	Total Depth Biofiltered	48.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	20	Option 1 - Biofilter 1.50 DCV: Target Volume	7,653	0	0	0	0	0	0	0	0	0	cubic-feet
	21	Option 1 - Provided Biofiltration Volume	7,653	0	0	0	0	0	0	0	0	0	cubic-feet
	22	Option 2 - Store 0.75 DCV: Target Volume	3,827	0	0	0	0	0	0	0	0	0	cubic-feet
	23	Option 2 - Provided Storage Volume	3,827	0	0	0	0	0	0	0	0	0	cubic-feet
	24	Percentage of Performance Requirement Satisfied	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	25	**Deficit of Effectively Treated Stormwater**	**0**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

Worksheet B.5-1 General Notes:

A. Applicants may use this worksheet to size Lined Biofiltration BMPs (BF-1) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

Automated Worksheet B.5-2: Sizing Partial Retention BMPs (V1.1)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	0	Drainage Basin ID or Name	-	-	-	-	-	-	-	-	-	-	sq-ft
	1	Effective Tributary Area	-	-	-	-	-	-	-	-	-	-	sq-ft
	2	Minimum Biofiltration Footprint Sizing Factor	-	-	-	-	-	-	-	-	-	-	ratio
	3	Design Capture Volume Tributary to BMP	-	-	-	-	-	-	-	-	-	-	cubic-feet
	4	Provided Partial Retention BMP Surface Area											sq-ft
	5	Provided Surface Ponding Depth											inches
	6	Provided Soil Media Thickness											inches
	7	Provided Depth of Gravel Above Underdrain Invert											inches
	8	Hydromodification Orifice Diameter of Underdrain											inches
	9	Provided Depth of Gravel Below the Underdrain											inches
	10	Native Soil Infiltration Rate											in/hr
Retention Calculations	11	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	12	Soil Media Pore Space Available for Retention	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	unitless
	13	Gravel Pore Space Available for Retention	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	14	Effective Retention Depth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	15	Calculated Drawdown for Gravel Below Underdrain (Including 6 Hr Storm)	36	36	36	36	36	36	36	36	36	36	hours
	16	Volume Retained by BMP	0	0	0	0	0	0	0	0	0	0	cubic-feet
	17	Fraction of DCV Retained	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	18	Portion of Retention Performance Standard Satisfied	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	19	Equivalent Fraction of DCV Retained with 36-hr Drawdown	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	20	Design Capture Volume Remaining for Biofiltration	0	0	0	0	0	0	0	0	0	0	cubic-feet
Biofiltration Calculations	21	Max Hydromod Flow Rate through Underdrain	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	CFS
	22	Max Soil Filtration Rate Allowed by Underdrain Orifice	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	in/hr
	23	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	24	Soil Media Filtration Rate to be used for Sizing	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	25	Depth Biofiltered Over 6 Hour Storm	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	26	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	27	Effective Depth of Biofiltration Storage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	28	Drawdown Time for Surface Ponding	0	0	0	0	0	0	0	0	0	0	hours
	29	Drawdown Time for Effective Biofiltration Depth	0	0	0	0	0	0	0	0	0	0	hours
	30	Total Depth Biofiltered	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	inches
	31	Option 1 - Biofilter 1.50 DCV: Target Volume	0	0	0	0	0	0	0	0	0	0	cubic-feet
	32	Option 1 - Provided Biofiltration Volume	0	0	0	0	0	0	0	0	0	0	cubic-feet
	33	Option 2 - Store 0.75 DCV: Target Volume	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Option 2 - Provided Storage Volume	0	0	0	0	0	0	0	0	0	0	cubic-feet
	35	Portion of Biofiltration Performance Standard Satisfied	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	36	Overall Portion of Performance Standard Satisfied	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	37	**Deficit of Effectively Treated Stormwater**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

Worksheet B.5-2 General Notes:

A. Applicants may use this worksheet to size Partial Retention BMPs (PR-1) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

Automated Worksheet B.5-3: Alternate Minimum Biofiltration Footprint Ratio (V1.1)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Drainage Basin Inputs (Optional)	0	Drainage Basin ID or Name	1	-	-	-	-	-	-	-	-	-	unitless
	1	Total Tributary Area	127,547	-	-	-	-	-	-	-	-	-	sq-ft
	2	Final Adjusted Runoff Factor	0.75	-	-	-	-	-	-	-	-	-	unitless
	3	Average Annual Precipitation											inches
	4	Load to Clog (default =2.0)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	lb/sq-ft
	5	Allowable Period to Accumulate Clogging Load (default =10)	10	10	10	10	10	10	10	10	10	10	years
	6	Pretreatment Measures Included?	No	No	No	No	No	No	No	No	No	No	yes/no
	7	Commercial: TSS=128 mg/L, C= 0.80											sq-ft
	8	Education: TSS=132 mg/L, C= 0.50											sq-ft
	9	Industrial: TSS=125 mg/L, C= 0.90											sq-ft
	10	Low Traffic Areas: TSS=50 mg/L, C= 0.50											sq-ft
	11	Multi-Family Residential: TSS=40 mg/L, C= 0.60											sq-ft
	12	Roof Areas: TSS=14 mg/L, C= 0.90											sq-ft
	13	Single Family Residential: TSS=123 mg/L, C= 0.40											sq-ft
	14	Transportation: TSS=78 mg/L, C= 0.90											sq-ft
	15	Vacant/Open Space: TSS=216 mg/L, C= 0.10											sq-ft
Minimum Footprint Calculations	16	Effective-Area Based on Specified Land Use Coefficients	0	0	0	0	0	0	0	0	0	0	sq-ft
	17	Average TSS Concentration for Tributary	0	0	0	0	0	0	0	0	0	0	mg/L
	18	Effective Tributary Area	95,660	0	0	0	0	0	0	0	0	0	sq-ft
	19	Average Annual Runoff	0	0	0	0	0	0	0	0	0	0	cubic-feet
	20	Average Annual TSS Load	0	0	0	0	0	0	0	0	0	0	lb/yr
	21	Average Annual TSS Load After Pretreatment Measures	0	0	0	0	0	0	0	0	0	0	lb/yr
Result	22	Minimum Allowable Biofiltration Footprint Ratio	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	ratio

Worksheet B.5-3 General Notes:

A. Applicants may use this worksheet to calculate Alternate Minimum Biofiltration Footprint Ratios for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below.

Automated Worksheet B.6-1: Sizing Flow-Thru BMPs (V1.1)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Flow-Thru BMP Inputs	0	Drainage Basin ID or Name	-	-	-	-	-	-	-	-	-	-	unitless
	1	Total Tributary Area	-	-	-	-	-	-	-	-	-	-	sq-ft
	2	Final Adjusted Runoff Factor	-	-	-	-	-	-	-	-	-	-	unitless
	3	Design Capture Volume	-	-	-	-	-	-	-	-	-	-	cubic-feet
	4	Volume Effectively Retained and/or Biofiltered	-	-	-	-	-	-	-	-	-	-	cubic-feet
	5	Deficit of Effectively Treated Stormwater Requiring Flow-Thru Treatment	-	-	-	-	-	-	-	-	-	-	cubic-feet
	6	Maximum Rated Water Quality Flow Rate of Proposed BMP											CFS
Flow Rate Calculations	7	Adjustment Factor	-	-	-	-	-	-	-	-	-	-	unitless
	8	Design Rainfall Intensity for Flow-Thru BMPs	-	-	-	-	-	-	-	-	-	-	in/hr
	9	Water Quality Flow Rate Requiring Flow-Thru Treatment	-	-	-	-	-	-	-	-	-	-	CFS
Result	10	Is Flow-Thru BMP Adequately Sized?	-	-	-	-	-	-	-	-	-	-	unitless

Worksheet B.6-1 General Notes:

A. Applicants may use this worksheet to size flow-thru BMPs for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. Applicants proposing on-site flow-thru BMPs must also implement an offsite alternative compliance project to offset the deficit of effectively treated stormwater volume.

Summary of Stormwater Pollutant Control Calculations (V1.1)

Category	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Drainage Basin Inputs	Drainage Basin ID or Name	1	2	3	4	5	6	7	8	9	10	unitless
	Total Area Tributary to BMP	127,547	0	0	0	0	0	0	0	0	0	sq-ft
	Composite Runoff Factor for Standard Drainage Areas	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	85th Percentile 24-hr Storm Depth	0.64	0	0	0	0	0	0	0	0	0	inches
	Initial Design Capture Volume	5,102	0	0	0	0	0	0	0	0	0	cubic-feet
Volume Reductions	Final Adjusted Tributary Runoff Factor	0.75	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	Final Effective Tributary Area	95,660	0	0	0	0	0	0	0	0	0	sq-ft
	Tree Well and Rain Barrel Reductions	0	0	0	0	0	0	0	0	0	0	cubic-feet
	Design Capture Volume Tributary to BMP	5,102	0	0	0	0	0	0	0	0	0	cubic-feet
BMP Sizing	Basin Drains to the Following BMP Type	Biofiltration	0	0	0	0	0	0	0	0	0	unitless
	Deficit of Effectively Treated Stormwater	0	-	-	-	-	-	-	-	-	-	cubic-feet

Summary Notes:

All fields in this summary worksheet are populated based on previous user inputs. Drainage basins achieving full compliance with performance requirements for onsite pollutant control are highlighted in green. Drainage basins not achieving full compliance are highlighted in red and summarized below. Please note that drainage areas using De Minimis, Self-Mitigating, and/or Self-Retaining classifications may be required to provide additional supporting information.

-Congratulations, all specified drainage basins and BMPs are in compliance with stormwater pollutant control requirements. Include 11x17 color prints of this summary sheet and supporting worksheet calculations as part of the SWQMP submittal package.

Harvest and Use Feasibility Checklist		Form I-7
1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season? ☐ Toilet and urinal flushing ☐ Landscape irrigation ☐ Other:______________		
2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2. 36-Hour Toilet Use per Resident or Employee: 0.37 ft^3, Subtotal: Anticipated 36 Hour Toilet Use: 46 ft^3, Anticipated 1 Acre Landscape Use Over 36 Hours: 52.14 ft^3, Subtotal: Anticipated Landscape Use Over 36 Hours: 38 ft^3, Total Anticipated Use Over 36 Hours: 84 ft^3, Total Anticipated Use/ Design Capture Volume: 0.02 ft^3		
3. Calculate the DCV using worksheet B-2.1. DCV = 5,034 (cubic feet)		
3a. Is the 36 hour demand greater than or equal to the DCV? ☐ Yes / ☒ No ⇨ ⇩	3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV? ☐ Yes / ☒ No ⇨ ⇩	3c. Is the 36 hour demand less than 0.25DCV? ☒ Yes ⇩
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible.
Is harvest and use feasible based on further evaluation? ☐ Yes, refer to Appendix E to select and size harvest and use BMPs. ☒ No, select alternate BMPs.		

Categorization of Infiltration Feasibility Condition	Form I-8

Part 1 - Full Infiltration Feasibility Screening Criteria

Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒

Provide basis:

Based on percolation testing at the site, the calculated Infiltration Rate at both test borings is 0.11 in/hr with a factor of safety of 2.0 applied per geotechnical evaluation by EEI Engineering Solutions, dated October 29, 2018.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Criteria	Screening Question	Yes	No
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

Measured infiltration rates are less than 0.5 in/hr. See Criteria 1.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.

Form I-8 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Measured infiltration rates are less than 0.5 in/hr. See Criteria 1. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Measured infiltration rates are less than 0.5 in/hr. See Criteria 1. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		☐Full Infiltration ☒No

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Form I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☒	☐

Provide basis:

Per geotechnical evaluation by EEI Engineering Solutions, dated October 29, 2018, percolation testing was conducted within two borings at depths of approximately 15 and 9 feet below existing ground surface. Tests were run at intervals of 30 minutes for each boring, and the resulting percolation rate was converted to an infiltration rate using the Porchet Method. A factor of safety of 2.0 was applied to the calculated infiltration rate, per the City of Oceanside/County of San Diego BMP guidelines. The measured infiltration rate at both borings is 0.11 in/hr.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Criteria	Screening Question	Yes	No
6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒

Provide basis:

Per geotechnical evaluation by EEI Engineering Solutions, dated October 29, 2018, percolation testing was conducted within decomposed granite bedrock, which has the consistency of sandy clay and clayey sand, and is the reason for the low infiltration rates. While the measured infiltration could technically allow for partial infiltration at the site, they could also pose a hazard to utilities for the proposed development.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

<table>
<tr><th colspan="4">Form I-8 Page 4 of 4</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>7</td><td>Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>☒</td><td>☐</td></tr>
<tr><td colspan="4">Provide basis:

Groundwater was not encountered during our subsurface investigation to the maximum depth of 17.5 feet below ground surface. There are no known contaminants onsite.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</td></tr>
<tr><td>8</td><td>Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>☐</td><td>☒</td></tr>
<tr><td colspan="4">Provide basis:

The question requires the expertise of water-rights lawyers to determine if any violation can be expected downstream by reducing the run-off slightly via infiltration of the water into bioretention or stormwater devices.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.</td></tr>
<tr><td>Part 2 Result*</td><td colspan="2">If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.

If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.</td><td>☐Partial Infiltration

☒No Infiltration</td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Alternative Compliance

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

☐Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 2a	1. Hydromodification Management Exhibit (Required)	☒Included See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☒Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐6.2.1 Verification of Geomorphic Landscape Units Onsite ☐6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☒Not performed ☐Included ☐Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	☒Included ☐Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐Included ☒Not required because BMPs will drain in less than 96 hours

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

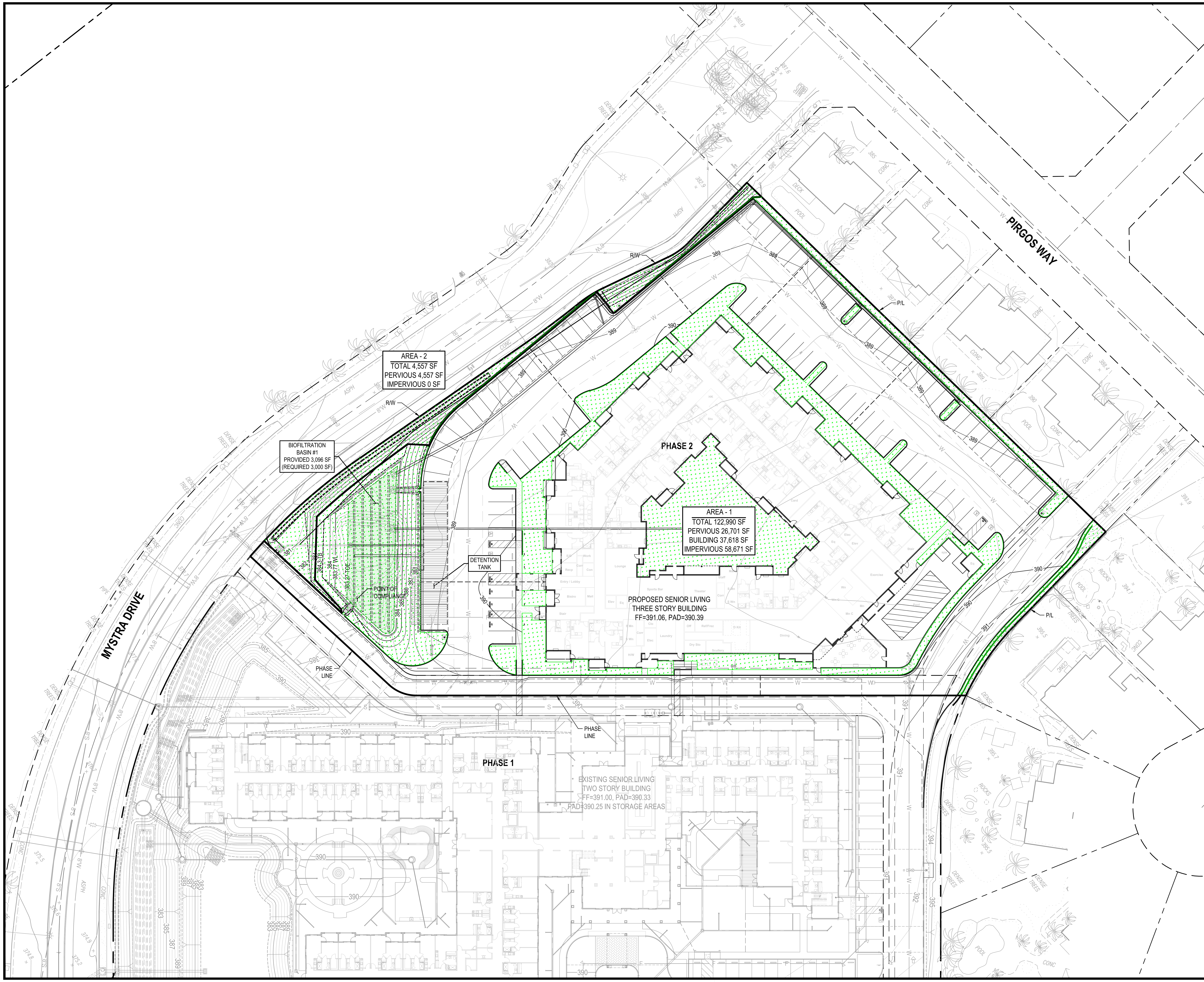
The Hydromodification Management Exhibit must identify:

☒Underlying hydrologic soil group
☒Approximate depth to groundwater
☒Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☒Critical coarse sediment yield areas to be protected
☒Existing topography
☒Existing and proposed site drainage network and connections to drainage offsite
☒Proposed grading
☒Proposed impervious features
☒Proposed design features and surface treatments used to minimize imperviousness
☒Point(s) of Compliance (POC) for Hydromodification Management
☒Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
☒Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)

Please provide the Exhibit in 24”x36” format with map pocket, wet date, and stamp.

Placeholder – **Hydromodification Management Exhibit**

Replace placeholder with required exhibit.



LEGEND:

- PROPOSED LANDSCAPE AREA
- PROPOSED BIOFILTRATION AREA
- BIOSWALE
- DRAINAGE BOUNDARY

1. SOIL GROUP D.
2. DEPTH TO GROUNDWATER > 15 FT BELOW GROUND SURFACE.
3. NO WATERCOURSES, STREAMS, OR WETLANDS AT SITE.
4. NO CRITICAL COARSE SEDIMENTS YIELD AREAS TO BE PROTECTED BECAUSE EXISTING SITE IS RELATIVELY FLAT.

DIGALERT — DIAL TOLL FREE 1-800-227-2600 — TWO WORKING DAYS BEFORE YOU DIG — A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

REVISIONS	
DATE	△ DESCRIPTION

BENCH MARK - CITY OF OCEANSIDE BENCH MARK No. E-74. A BRASS DISK STAMPED "COS BM E-74" ON TOP OF CURB AT THE EASTERLY POINT OF CURVATURE, NORTHESTERLY CURB RETURN AT CANNON ROAD AND NIGHTHAWK COURT. NGVD 1929 ELEVATION = 485.110 FEET; ADD 2.26' TO CONVERT TO NAVD 1988.

BASIS OF BEARINGS - THE CALIFORNIA COORDINATE SYSTEM - 1983 (CCS83), ZONE IV, 1991.35 EPOCH, NORTH AMERICAN DATUM OF 1983 (NAD83). GRID BEARING BETWEEN STATION V2017 AND STATION V2016 DERIVED FROM COORDINATES PUBLISHED IN THE CITY OF VISTA SURVEY CONTROL NETWORK ESTABLISHED BY RECORD OF SURVEY No. 14023, FILED IN THE OFFICE OF THE SAN DIEGO COUNTY RECORDER ON DECEMBER 23, 1992. I.E. NORTH 14°51'28.9" WEST.

REGISTERED PROFESSIONAL ENGINEER — MAHIR WABER — No. C69050 — Exp. 6/30/20 — CIVIL — STATE OF CALIFORNIA

Waber Consultants INC
PLANNING CIVIL ENGINEERING SURVEYING
3711 LONG BEACH BLVD, STE 1008, LONG BEACH, CA 90807
P (562) 426-8285 F (562) 372-5282

HYDROMODIFICATION MANAGEMENT EXHIBIT

CIVIL IMPROVEMENT PLANS

OCEAN HILLS SENIOR LIVING FACILITY - PHASE 2
4500 CANNON ROAD, OCEANSIDE, CA 92056

JOB NO. 18045

DATE: 1/22/2019

SHEET OF 5 SHEETS

W:\18-045 OCEAN HILLS ALF\DWG\18045EH2 HYDMOD MAN.dwg Jan 22, 2019 - 11:48am

Placeholder – **WMAA Exhibit**

Replace placeholder with required exhibit.

WMAA Exhibit

Exhibit shows that there are no critical coarse sediment yield areas to be protected.

SDHM 3.1

PROJECT REPORT

General Model Information

Project Name:	OCEAN HILLS ALF
Site Name:	OCEAN HILLS ALF
Site Address:	4500 CANNON ROAD
City:	OCEANSIDE
Report Date:	10/25/2018
Gage:	OCEANSID
Data Start:	10/01/1959
Data End:	09/30/2004
Timestep:	Hourly
Precip Scale:	1.000
Version Date:	2017/08/18

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data
Predeveloped Land Use

AREA 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C,NatVeg,Flat	2.93
Pervious Total	2.93
Impervious Land Use	acre
Impervious Total	0
Basin Total	2.93

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

AREA 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C,NatVeg,Flat	0.61
Pervious Total	0.61
Impervious Land Use	acre
IMPERVIOUS-FLAT	2.32
Impervious Total	2.32
Basin Total	2.93

Element Flows To:

Surface	Interflow	Groundwater
Biofiltrat Surface 1	Biofiltrat Surface 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Biofiltration Basin 1

Bottom Length:	111.75 ft.
Bottom Width:	33.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	Amended 5 in/hr
Material thickness of second layer:	2.5
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Underdrain used	
Underdrain Diameter (feet):	1
Orifice Diameter (in.):	11.99
Offset (in.):	0
Flow Through Underdrain (ac-ft.):	75.364
Total Outflow (ac-ft.):	78.107
Percent Through Underdrain:	96.49

Discharge Structure
Riser Height: 0.5 ft.
Riser Diameter: 8 in.
Element Flows To:
Outlet 1 Outlet 2
StormTrap

In Ground Planter Box Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0847	0.0000	0.0000	0.0000
0.0532	0.0847	0.0019	0.0000	0.0000
0.1064	0.0847	0.0038	0.0000	0.0000
0.1596	0.0847	0.0057	0.0000	0.0000
0.2127	0.0847	0.0076	0.0000	0.0000
0.2659	0.0847	0.0095	0.0000	0.0000
0.3191	0.0847	0.0113	0.0000	0.0000
0.3723	0.0847	0.0132	0.0000	0.0000
0.4255	0.0847	0.0151	0.0000	0.0000
0.4787	0.0847	0.0170	0.0000	0.0000
0.5319	0.0847	0.0189	0.0000	0.0000
0.5851	0.0847	0.0208	0.0000	0.0000
0.6382	0.0847	0.0227	0.0000	0.0000
0.6914	0.0847	0.0246	0.0000	0.0000
0.7446	0.0847	0.0265	0.0000	0.0000
0.7978	0.0847	0.0284	0.0000	0.0000
0.8510	0.0847	0.0303	0.0000	0.0000
0.9042	0.0847	0.0321	0.0000	0.0000
0.9574	0.0847	0.0340	0.0000	0.0000
1.0105	0.0847	0.0359	0.0000	0.0000
1.0637	0.0847	0.0378	0.0000	0.0000
1.1169	0.0847	0.0397	0.0000	0.0000
1.1701	0.0847	0.0416	0.0000	0.0000
1.2233	0.0847	0.0435	0.0000	0.0000
1.2765	0.0847	0.0454	0.0000	0.0000
1.3297	0.0847	0.0473	0.0000	0.0000
1.3829	0.0847	0.0492	0.0000	0.0000
1.4360	0.0847	0.0511	0.0000	0.0000
1.4892	0.0847	0.0530	0.0000	0.0000

1.5424	0.0847	0.0548	0.0000	0.0000
1.5956	0.0847	0.0567	0.0000	0.0000
1.6488	0.0847	0.0586	0.0000	0.0000
1.7020	0.0847	0.0604	0.0000	0.0000
1.7552	0.0847	0.0623	0.0000	0.0000
1.8084	0.0847	0.0642	0.0000	0.0000
1.8615	0.0847	0.0660	0.0000	0.0000
1.9147	0.0847	0.0679	0.0000	0.0000
1.9679	0.0847	0.0698	0.0000	0.0000
2.0211	0.0847	0.0716	0.0000	0.0000
2.0743	0.0847	0.0735	0.0000	0.0000
2.1275	0.0847	0.0754	0.0000	0.0000
2.1807	0.0847	0.0772	0.0000	0.0000
2.2338	0.0847	0.0791	0.0000	0.0000
2.2870	0.0847	0.0810	0.0000	0.0000
2.3402	0.0847	0.0829	0.0000	0.0000
2.3934	0.0847	0.0847	0.0000	0.0000
2.4466	0.0847	0.0866	0.0000	0.0000
2.4998	0.0847	0.0885	0.0000	0.0000
2.5530	0.0847	0.0903	0.0000	0.0000
2.6062	0.0847	0.0922	0.0000	0.0000
2.6593	0.0847	0.0941	0.0000	0.0000
2.7125	0.0847	0.0959	0.0000	0.0000
2.7657	0.0847	0.0978	0.0000	0.0000
2.8189	0.0847	0.0997	0.0000	0.0000
2.8721	0.0847	0.1015	0.0000	0.0000
2.9253	0.0847	0.1034	0.0000	0.0000
2.9785	0.0847	0.1053	0.0000	0.0000
3.0316	0.0847	0.1071	0.0000	0.0000
3.0848	0.0847	0.1090	0.0000	0.0000
3.1380	0.0847	0.1109	0.0000	0.0000
3.1912	0.0847	0.1127	0.0000	0.0000
3.2444	0.0847	0.1146	0.0000	0.0000
3.2976	0.0847	0.1165	0.0000	0.0000
3.3508	0.0847	0.1184	0.0000	0.0000
3.4040	0.0847	0.1202	0.0000	0.0000
3.4571	0.0847	0.1221	0.0000	0.0000
3.5103	0.0847	0.1240	0.0000	0.0000
3.5635	0.0847	0.1258	0.0000	0.0000
3.6167	0.0847	0.1277	0.0000	0.0000
3.6699	0.0847	0.1296	0.0000	0.0000
3.7231	0.0847	0.1314	0.0000	0.0000
3.7763	0.0847	0.1333	0.0000	0.0000
3.8295	0.0847	0.1352	0.0000	0.0000
3.8826	0.0847	0.1370	0.0000	0.0000
3.9358	0.0847	0.1389	0.0000	0.0000
3.9890	0.0847	0.1408	0.0000	0.0000
4.0000	0.0847	0.1412	0.0000	0.0000

In Ground Planter Box Hydraulic Table

Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**To Amended(cfs)**	**Infilt(cfs)**
4.0000	0.0847	0.1412	0.0000	0.4369	0.0000
4.0532	0.0847	0.1457	0.0000	0.4369	0.0000
4.1064	0.0847	0.1502	0.0000	0.4369	0.0000
4.1596	0.0847	0.1547	0.0000	0.4369	0.0000
4.2127	0.0847	0.1592	0.0008	0.4369	0.0000
4.2659	0.0847	0.1637	0.0019	0.4369	0.0000
4.3191	0.0847	0.1682	0.0037	0.4369	0.0000

4.3723	0.0847	0.1727	0.0062	0.4369	0.0000
4.4255	0.0847	0.1772	0.0096	0.4369	0.0000
4.4787	0.0847	0.1817	0.0139	0.4369	0.0000
4.5319	0.0847	0.1862	0.0193	0.4369	0.0000
4.5851	0.0847	0.1907	0.0244	0.4369	0.0000
4.6382	0.0847	0.1952	0.0257	0.4369	0.0000
4.6914	0.0847	0.1997	0.0334	0.4369	0.0000
4.7446	0.0847	0.2042	0.0422	0.4369	0.0000
4.7978	0.0847	0.2087	0.0523	0.4369	0.0000
4.8400	0.0847	0.2123	0.0587	0.4369	0.0000

Biofiltrat Surface 1

Element Flows To:

Outlet 1	Outlet 2
StormTrap	Biofiltration Basin 1

StormTrap

Width: 50 ft.
Length: 42.5 ft.
Depth: 3 ft.
Discharge Structure
Riser Height: 2.5 ft.
Riser Diameter: 12 in.
Element Flows To:
Outlet 1 Outlet 2

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.048	0.000	0.000	0.000
0.0333	0.048	0.001	0.000	0.000
0.0667	0.048	0.003	0.000	0.000
0.1000	0.048	0.004	0.000	0.000
0.1333	0.048	0.006	0.000	0.000
0.1667	0.048	0.008	0.000	0.000
0.2000	0.048	0.009	0.000	0.000
0.2333	0.048	0.011	0.000	0.000
0.2667	0.048	0.013	0.000	0.000
0.3000	0.048	0.014	0.000	0.000
0.3333	0.048	0.016	0.000	0.000
0.3667	0.048	0.017	0.000	0.000
0.4000	0.048	0.019	0.000	0.000
0.4333	0.048	0.021	0.000	0.000
0.4667	0.048	0.022	0.000	0.000
0.5000	0.048	0.024	0.000	0.000
0.5333	0.048	0.026	0.000	0.000
0.5667	0.048	0.027	0.000	0.000
0.6000	0.048	0.029	0.000	0.000
0.6333	0.048	0.030	0.000	0.000
0.6667	0.048	0.032	0.000	0.000
0.7000	0.048	0.034	0.000	0.000
0.7333	0.048	0.035	0.000	0.000
0.7667	0.048	0.037	0.000	0.000
0.8000	0.048	0.039	0.000	0.000
0.8333	0.048	0.040	0.000	0.000
0.8667	0.048	0.042	0.000	0.000
0.9000	0.048	0.043	0.000	0.000
0.9333	0.048	0.045	0.000	0.000
0.9667	0.048	0.047	0.000	0.000
1.0000	0.048	0.048	0.000	0.000
1.0333	0.048	0.050	0.000	0.000
1.0667	0.048	0.052	0.000	0.000
1.1000	0.048	0.053	0.000	0.000
1.1333	0.048	0.055	0.000	0.000
1.1667	0.048	0.056	0.000	0.000
1.2000	0.048	0.058	0.000	0.000
1.2333	0.048	0.060	0.000	0.000
1.2667	0.048	0.061	0.000	0.000
1.3000	0.048	0.063	0.000	0.000
1.3333	0.048	0.065	0.000	0.000
1.3667	0.048	0.066	0.000	0.000
1.4000	0.048	0.068	0.000	0.000

1.4333	0.048	0.069	0.000	0.000
1.4667	0.048	0.071	0.000	0.000
1.5000	0.048	0.073	0.000	0.000
1.5333	0.048	0.074	0.000	0.000
1.5667	0.048	0.076	0.000	0.000
1.6000	0.048	0.078	0.000	0.000
1.6333	0.048	0.079	0.000	0.000
1.6667	0.048	0.081	0.000	0.000
1.7000	0.048	0.082	0.000	0.000
1.7333	0.048	0.084	0.000	0.000
1.7667	0.048	0.086	0.000	0.000
1.8000	0.048	0.087	0.000	0.000
1.8333	0.048	0.089	0.000	0.000
1.8667	0.048	0.091	0.000	0.000
1.9000	0.048	0.092	0.000	0.000
1.9333	0.048	0.094	0.000	0.000
1.9667	0.048	0.095	0.000	0.000
2.0000	0.048	0.097	0.000	0.000
2.0333	0.048	0.099	0.000	0.000
2.0667	0.048	0.100	0.000	0.000
2.1000	0.048	0.102	0.000	0.000
2.1333	0.048	0.104	0.000	0.000
2.1667	0.048	0.105	0.000	0.000
2.2000	0.048	0.107	0.000	0.000
2.2333	0.048	0.108	0.000	0.000
2.2667	0.048	0.110	0.000	0.000
2.3000	0.048	0.112	0.000	0.000
2.3333	0.048	0.113	0.000	0.000
2.3667	0.048	0.115	0.000	0.000
2.4000	0.048	0.117	0.000	0.000
2.4333	0.048	0.118	0.000	0.000
2.4667	0.048	0.120	0.000	0.000
2.5000	0.048	0.122	0.000	0.000
2.5333	0.048	0.123	0.064	0.000
2.5667	0.048	0.125	0.182	0.000
2.6000	0.048	0.126	0.333	0.000
2.6333	0.048	0.128	0.509	0.000
2.6667	0.048	0.130	0.703	0.000
2.7000	0.048	0.131	0.907	0.000
2.7333	0.048	0.133	1.115	0.000
2.7667	0.048	0.135	1.318	0.000
2.8000	0.048	0.136	1.509	0.000
2.8333	0.048	0.138	1.683	0.000
2.8667	0.048	0.139	1.834	0.000
2.9000	0.048	0.141	1.960	0.000
2.9333	0.048	0.143	2.060	0.000
2.9667	0.048	0.144	2.138	0.000
3.0000	0.048	0.146	2.203	0.000
3.0333	0.048	0.148	2.300	0.000
3.0667	0.000	0.000	2.371	0.000

Analysis Results
POC 1

Model Default Modifications

Total of 0 changes have been made.

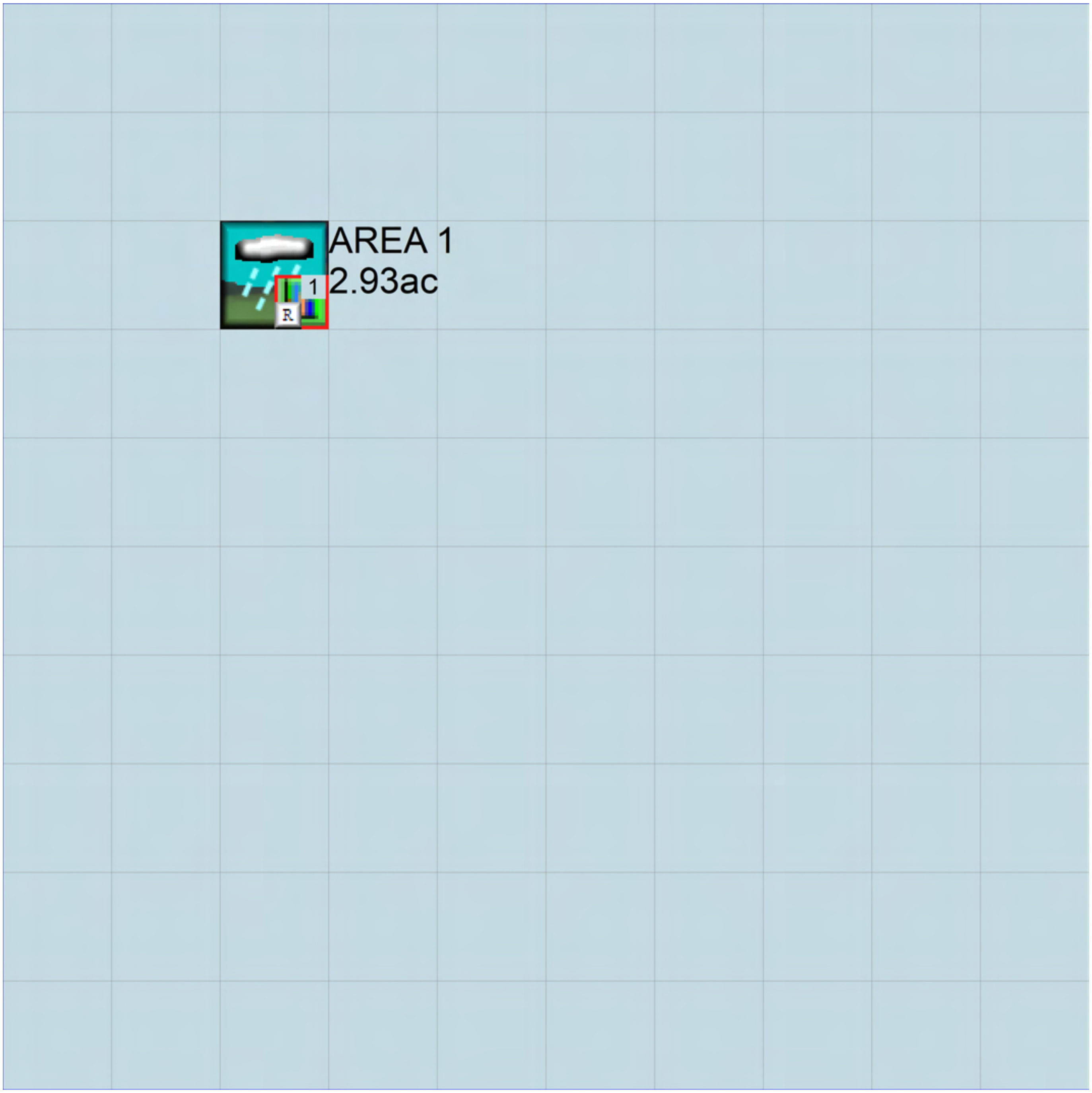
PERLND Changes

No PERLND changes have been made.

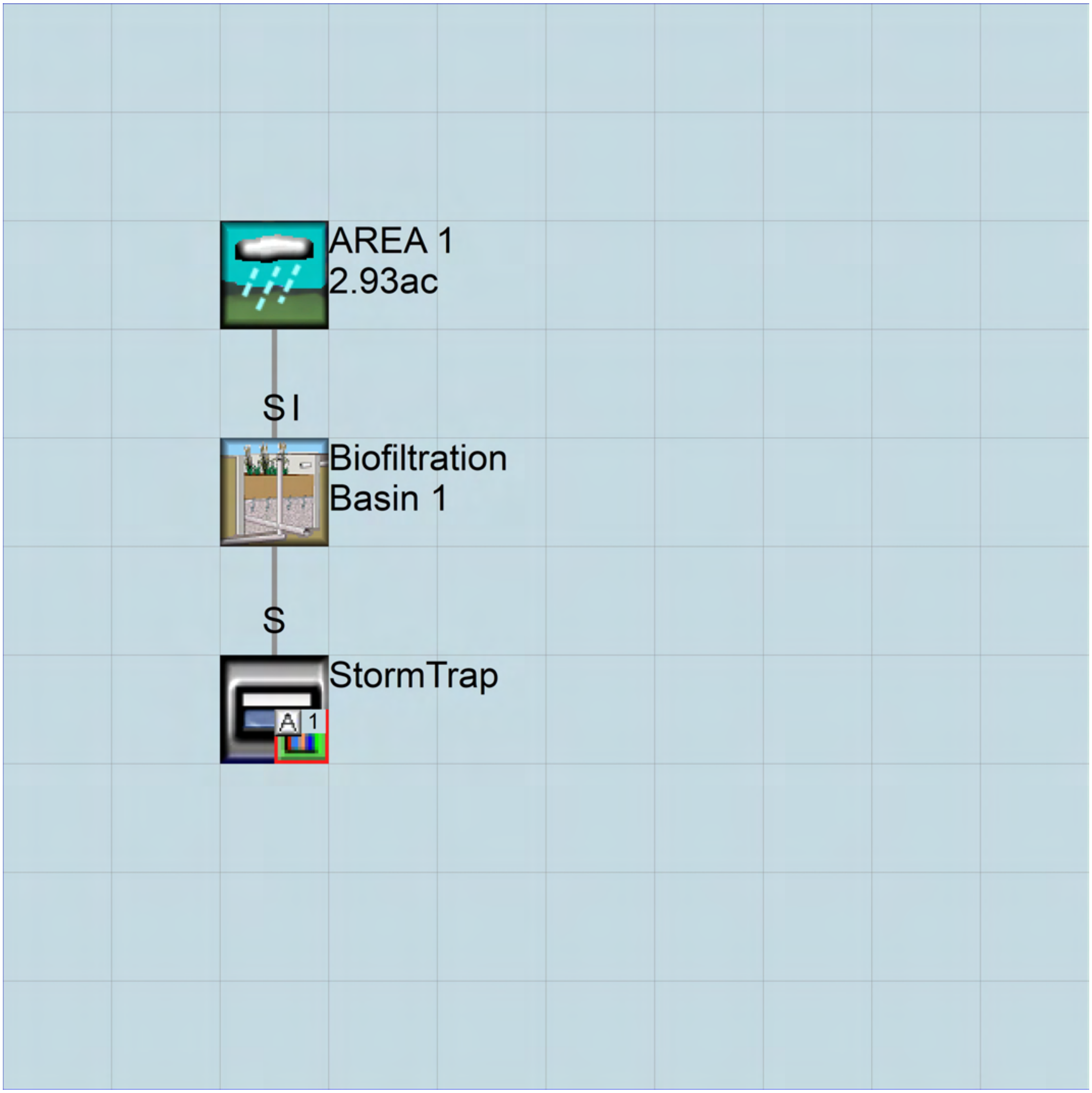
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1959 10 01        END    2004 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM        26   OCEAN HILLS ALF.wdm
MESSU      25   MitOCEAN HILLS ALF.MES
           27   MitOCEAN HILLS ALF.L61
           28   MitOCEAN HILLS ALF.L62
           30   POCOCEAN HILLS ALF1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:60
      PERLND      19
      IMPLND       1
      RCHRES       1
      RCHRES       2
      RCHRES       3
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                            User  t-series Engl Metr ***
                                            in  out           ***
   19      C,NatVeg,Flat          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   19         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
```

```
    <PLS > **************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   19         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   19         0    1    1    1    0    0    0    0    1    1    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   19              0       4.8      0.05       200      0.05       2.5     0.915
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   19              0         0         2         2         0      0.05      0.05
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                   ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   19              0       0.6       0.2       1.5       0.7         0
  END PWAT-PARM4
  MON-LZETPARM
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   19       0.4  0.4  0.4  0.4  0.6  0.6  0.6  0.6  0.6  0.4  0.4  0.4
  END MON-LZETPARM
  MON-INTERCEP
    <PLS >      PWATER input info: Part 3         ***
    # -  #  JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC  ***
   19       0.1  0.1  0.1  0.1 0.06 0.06 0.06 0.06 0.06  0.1  0.1  0.1
  END MON-INTERCEP

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   19              0         0      0.01         0       0.4      0.01         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------->   Unit-systems   Printer ***
    # -  #                      User  t-series Engl Metr ***
                                        in  out          ***
    1      IMPERVIOUS-FLAT        1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
```

```
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1        0    0    0    0    1
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    1            100      0.05      0.05       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1             0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1             0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
AREA 1***
PERLND  19                        0.72     RCHRES   1      2
PERLND  19                        0.72     RCHRES   1      3
IMPLND   1                        2.21     RCHRES   1      5

******Routing******
RCHRES   2                           1     RCHRES   3      6
RCHRES   2                                 COPY     1     16
RCHRES   1                           1     RCHRES   3      7
RCHRES   1                                 COPY     1     17
RCHRES   1                           1     RCHRES   2      8
RCHRES   3                           1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   12.1        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                           in  out                           ***
    1     Biofiltrat Surfa-020    3    1    1    1   28    0    1
    2     Biofiltration Ba-019    1    1    1    1   28    0    1
    3     Trapezoidal Pond-040    1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
```

```
  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                     ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  5  6  0  0       0  0  0  0  0       2  2  2  2  2
    2        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
    3        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50          ***
  <------><--------><--------><--------><--------><--------><-------->        ***
    1             1      0.01       0.0       0.0       0.5       0.0
    2             2      0.02       0.0       0.0       0.5       0.0
    3             3      0.02       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                        ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1           0          4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2           0          4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3           0          4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE       2
   67    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.084659  0.000000  0.000000
  0.053187  0.084659  0.001891  0.000000
  0.106374  0.084659  0.003782  0.000000
  0.159560  0.084659  0.005673  0.000000
  0.212747  0.084659  0.007565  0.000822
  0.265934  0.084659  0.009456  0.001921
  0.319121  0.084659  0.011347  0.003682
  0.372308  0.084659  0.013238  0.006211
  0.425495  0.084659  0.015129  0.009601
  0.478681  0.084659  0.017020  0.013937
  0.531868  0.084659  0.018912  0.019294
  0.585055  0.084659  0.020803  0.025744
  0.638242  0.084659  0.022694  0.033354
  0.691429  0.084659  0.024585  0.042186
  0.744615  0.084659  0.026476  0.042325
  0.797802  0.084659  0.028367  0.052301
  0.850989  0.084659  0.030258  0.063756
  0.904176  0.084659  0.032150  0.076605
  0.957363  0.084659  0.034041  0.090902
  1.010549  0.084659  0.035932  0.101883
  1.063736  0.084659  0.037823  0.106696
  1.116923  0.084659  0.039714  0.124038
  1.170110  0.084659  0.041605  0.142973
  1.223297  0.084659  0.043497  0.163549
  1.276484  0.084659  0.045388  0.185810
  1.329670  0.084659  0.047279  0.194588
```

```
  1.382857  0.084659  0.049170  0.209799
  1.436044  0.084659  0.051061  0.235558
  1.489231  0.084659  0.052952  0.263127
  1.542418  0.084659  0.054821  0.292545
  1.595604  0.084659  0.056690  0.323848
  1.648791  0.084659  0.058558  0.325100
  1.701978  0.084659  0.060427  0.357069
  1.755165  0.084659  0.062296  0.392232
  1.808352  0.084659  0.064164  0.429298
  1.861538  0.084659  0.066033  0.436905
  1.914725  0.084659  0.067901  0.436905
  1.967912  0.084659  0.069770  0.436905
  2.021099  0.084659  0.071639  0.436905
  2.074286  0.084659  0.073507  0.436905
  2.127473  0.084659  0.075376  0.436905
  2.180659  0.084659  0.077245  0.436905
  2.233846  0.084659  0.079113  0.436905
  2.287033  0.084659  0.080982  0.436905
  2.340220  0.084659  0.082851  0.436905
  2.393407  0.084659  0.084719  0.436905
  2.446593  0.084659  0.086588  0.436905
  2.499780  0.084659  0.088456  0.436905
  2.552967  0.084659  0.090325  0.436905
  2.606154  0.084659  0.092194  0.436905
  2.659341  0.084659  0.094062  0.436905
  2.712527  0.084659  0.095931  0.436905
  2.765714  0.084659  0.097800  0.436905
  2.818901  0.084659  0.099668  0.436905
  2.872088  0.084659  0.101537  0.436905
  2.925275  0.084659  0.103406  0.436905
  2.978462  0.084659  0.105274  0.436905
  3.031648  0.084659  0.107143  0.436905
  3.084835  0.084659  0.109012  0.436905
  3.138022  0.084659  0.110880  0.436905
  3.191209  0.084659  0.112749  0.436905
  3.244396  0.084659  0.114617  0.436905
  3.297582  0.084659  0.116486  0.436905
  3.350769  0.084659  0.118355  0.436905
  3.403956  0.084659  0.120223  0.436905
  3.457143  0.084659  0.122092  0.436905
  3.500000  0.084659  0.247195  0.436905
  END FTABLE  2
  FTABLE      1
   27    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)   (cfs)      (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.084659  0.000000  0.000000  0.000000  0.000000
  0.053187  0.084659  0.004503  0.000000  0.436905  0.000000
  0.106374  0.084659  0.009005  0.000000  0.436905  0.000000
  0.159560  0.084659  0.013508  0.000000  0.436905  0.000000
  0.212747  0.084659  0.018011  0.000000  0.436905  0.000000
  0.265934  0.084659  0.022514  0.000000  0.436905  0.000000
  0.319121  0.084659  0.027016  0.000000  0.436905  0.000000
  0.372308  0.084659  0.031519  0.000000  0.436905  0.000000
  0.425495  0.084659  0.036022  0.000000  0.436905  0.000000
  0.478681  0.084659  0.040525  0.000000  0.436905  0.000000
  0.531868  0.084659  0.045027  0.000000  0.436905  0.000000
  0.585055  0.084659  0.049530  0.000000  0.436905  0.000000
  0.638242  0.084659  0.054033  0.000000  0.436905  0.000000
  0.691429  0.084659  0.058536  0.000000  0.436905  0.000000
  0.744615  0.084659  0.063038  0.000000  0.436905  0.000000
  0.797802  0.084659  0.067541  0.000000  0.436905  0.000000
  0.850989  0.084659  0.072044  0.000000  0.436905  0.000000
  0.904176  0.084659  0.076547  0.000000  0.436905  0.000000
  0.957363  0.084659  0.081049  0.000000  0.436905  0.000000
  1.010549  0.084659  0.085552  0.011502  0.436905  0.000000
  1.063736  0.084659  0.090055  0.170387  0.436905  0.000000
  1.116923  0.084659  0.094558  0.420304  0.436905  0.000000
```

```
 1.170110  0.084659  0.099060  0.724168  0.436905  0.000000
 1.223297  0.084659  0.103563  1.052716  0.436905  0.000000
 1.276484  0.084659  0.108066  1.375999  0.436905  0.000000
 1.329670  0.084659  0.112569  1.665407  0.436905  0.000000
 1.340000  0.084659  0.113443  1.898756  0.436905  0.000000
 END FTABLE  1
 FTABLE      3
  91    4
    Depth      Area    Volume  Outflow1 Velocity  Travel Time***
     (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
 0.000000  0.039027  0.000000  0.000000
 0.066667  0.039745  0.002626  0.002819
 0.133333  0.040466  0.005299  0.003986
 0.200000  0.041190  0.008021  0.004882
 0.266667  0.041918  0.010791  0.005638
 0.333333  0.042649  0.013610  0.006303
 0.400000  0.043383  0.016478  0.006905
 0.466667  0.044120  0.019395  0.007458
 0.533333  0.044861  0.022361  0.007973
 0.600000  0.045605  0.025376  0.008457
 0.666667  0.046352  0.028442  0.008914
 0.733333  0.047103  0.031557  0.009349
 0.800000  0.047857  0.034722  0.009765
 0.866667  0.048614  0.037938  0.010164
 0.933333  0.049374  0.041204  0.010547
 1.000000  0.050138  0.044521  0.010917
 1.066667  0.050905  0.047889  0.011275
 1.133333  0.051675  0.051309  0.011623
 1.200000  0.052448  0.054779  0.011959
 1.266667  0.053225  0.058302  0.012287
 1.333333  0.054005  0.061876  0.012606
 1.400000  0.054788  0.065503  0.012918
 1.466667  0.055574  0.069181  0.013222
 1.533333  0.056364  0.072913  0.013519
 1.600000  0.057157  0.076697  0.013810
 1.666667  0.057953  0.080534  0.014094
 1.733333  0.058753  0.084424  0.014373
 1.800000  0.059556  0.088367  0.014647
 1.866667  0.060362  0.092365  0.014916
 1.933333  0.061171  0.096416  0.015180
 2.000000  0.061983  0.100521  0.015440
 2.066667  0.062799  0.104680  0.015695
 2.133333  0.063618  0.108894  0.015946
 2.200000  0.064441  0.113163  0.016193
 2.266667  0.065266  0.117486  0.016437
 2.333333  0.066095  0.121865  0.016677
 2.400000  0.066927  0.126299  0.016913
 2.466667  0.067763  0.130789  0.017147
 2.533333  0.068602  0.135334  0.017377
 2.600000  0.069444  0.139936  0.017604
 2.666667  0.070289  0.144594  0.017828
 2.733333  0.071137  0.149308  0.018050
 2.800000  0.071989  0.154079  0.018268
 2.866667  0.072844  0.158907  0.018485
 2.933333  0.073702  0.163791  0.018698
 3.000000  0.074564  0.168734  0.018910
 3.066667  0.075429  0.173733  0.019119
 3.133333  0.076297  0.178791  0.019325
 3.200000  0.077168  0.183906  0.019530
 3.266667  0.078043  0.189080  0.019732
 3.333333  0.078921  0.194312  0.019932
 3.400000  0.079802  0.199603  0.020131
 3.466667  0.080686  0.204952  0.020327
 3.533333  0.081574  0.210361  0.020522
 3.600000  0.082465  0.215829  0.020714
 3.666667  0.083359  0.221357  0.020905
 3.733333  0.084256  0.226944  0.021094
 3.800000  0.085157  0.232591  0.021282
 3.866667  0.086061  0.238298  0.021468
 3.933333  0.086968  0.244066  0.021652
```

```
  4.000000  0.087879  0.249894  0.021835
  4.066667  0.088793  0.255783  0.022016
  4.133333  0.089710  0.261733  0.022196
  4.200000  0.090630  0.267744  0.022374
  4.266667  0.091554  0.273817  0.022551
  4.333333  0.092480  0.279952  0.022726
  4.400000  0.093410  0.286148  0.022901
  4.466667  0.094344  0.292406  0.023073
  4.533333  0.095280  0.298727  0.023245
  4.600000  0.096220  0.305111  0.023415
  4.666667  0.097164  0.311557  0.023584
  4.733333  0.098110  0.318066  0.023752
  4.800000  0.099060  0.324638  0.189825
  4.866667  0.100013  0.331274  0.617309
  4.933333  0.100969  0.337973  1.193856
  5.000000  0.101928  0.344737  1.887635
  5.066667  0.102891  0.351564  2.709885
  5.133333  0.103857  0.358456  4.211733
  5.200000  0.104826  0.365412  6.154608
  5.266667  0.105799  0.372432  8.451960
  5.333333  0.106775  0.379518  11.05141
  5.400000  0.107754  0.386669  13.91454
  5.466667  0.108736  0.393886  17.00956
  5.533333  0.109722  0.401168  20.30791
  5.600000  0.110711  0.408515  23.78249
  5.666667  0.111703  0.415929  27.40666
  5.733333  0.112698  0.423409  31.15373
  5.800000  0.113697  0.430956  34.99665
  5.866667  0.114699  0.438569  38.90795
  5.933333  0.115704  0.446249  42.85977
  6.000000  0.116713  0.453996  46.82399
  END FTABLE  3
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1               PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1               IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1               PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1               IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1               RCHRES   1     EXTNL  PREC
WDM      2 PREC     ENGL    1               RCHRES   3     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5             RCHRES   1     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.7             RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    1               RCHRES   3     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   3 HYDR   RO     1 1        1      WDM   1016 FLOW     ENGL      REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1017 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     12.1      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     12.1      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
```

```
IMPLND     IWATER SURO       0.083333      RCHRES          INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
RCHRES     ROFLOW                          RCHRES          INFLOW
  END MASS-LINK    6

  MASS-LINK        7
RCHRES     OFLOW  OVOL   1                 RCHRES          INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES          INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       16
RCHRES     ROFLOW                          COPY            INPUT  MEAN
  END MASS-LINK   16

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY            INPUT  MEAN
  END MASS-LINK   17

END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

ERROR/WARNING ID: 238   1

The continuity error reported below is greater than 1 part in 1000 and is therefore considered high.

Did you specify any "special actions"? If so, they could account for it.

Relevant data are:
DATE/TIME: 1962/ 6/30 24: 0

RCHRES :   1

RELERR	STORS	STOR	MATIN	MATDIF
-0.04483	0.00000	0.0000E+00	0.00000	1.3808E-12

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or reach/reservior) at the end of the present interval.
STORS is the storage of material in the pu at the start of the present printout reporting period.
MATIN is the total inflow of material to the pu during the present printout reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the present printout reporting period.

ERROR/WARNING ID: 341   6

DATE/TIME: 1979/ 1/15 14: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value in the "volume" column of the last row of RCHTAB(). To continue the simulation the table has been extrapolated, based on information contained in the last two rows. This will usually result in some loss of accuracy. If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
27	4.9035E+03	4941.6	5234.5

ERROR/WARNING ID: 341   5

DATE/TIME: 1979/ 1/15 14: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	7375.5	-6.413E+04	8.6946	8.6946E+00	2

ERROR/WARNING ID: 341   6

DATE/TIME: 1983/10/ 1 2: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value

in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
27	4.9035E+03	4941.6	5101.6

ERROR/WARNING ID: 341 5

DATE/TIME: 1983/10/ 1 2: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	7375.5	-3.837E+04	5.2029	5.2029E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 1995/ 1/ 4 21: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
27	4.9035E+03	4941.6	4966.3

ERROR/WARNING ID: 341 5

DATE/TIME: 1995/ 1/ 4 21: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive
approximations, converged to an invalid value (not in range 0.0 to 1.0).
Probably ftable was extrapolated. If extrapolation was small, no problem.
Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	7375.5	-1.216E+04	1.6491	1.6491E+00	2

ERROR/WARNING ID: 341 6

DATE/TIME: 2003/ 4/14 17: 0

RCHRES: 1

The volume of water in this reach/mixed reservoir is greater than the value
in the "volume" column of the last row of RCHTAB(). To continue the
simulation the table has been extrapolated, based on information contained
in the last two rows. This will usually result in some loss of accuracy.
If depth is being calculated it will also cause an error condition.
Relevant data are:

NROWS	V1	V2	VOL
27	4.9035E+03	4941.6	5042.0

ERROR/WARNING ID: 341 5

DATE/TIME: 2003/ 4/14 17: 0

RCHRES: 1

Calculation of relative depth, using Newton's method of successive approximations, converged to an invalid value (not in range 0.0 to 1.0). Probably ftable was extrapolated. If extrapolation was small, no problem. Remedy; extend ftable. Relevant data are:

A	B	C	RDEP1	RDEP2	COUNT
0.0000E+00	7375.5	-2.682E+04	3.6365	3.6365E+00	2

Disclaimer

Legal Notice

This program and accompanying documentation are provided 'as-is' without warranty of any kind. The entire risk regarding the performance and results of this program is assumed by End User. Clear Creek Solutions Inc. and the governmental licensee or sublicensees disclaim all warranties, either expressed or implied, including but not limited to implied warranties of program and accompanying documentation. In no event shall Clear Creek Solutions Inc. be liable for any damages whatsoever (including without limitation to damages for loss of business profits, loss of business information, business interruption, and the like) arising out of the use of, or inability to use this program even if Clear Creek Solutions Inc. or their authorized representatives have been advised of the possibility of such damages.

Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

Placeholder – **6.2.1 Verification of GLUs Onsite** (if applicable)

Replace placeholder with required calculations/documentation.

Leave placeholder intact if not applicable.

☐Not Applicable

Downstream Systems Sensitivity to Course Sediment			Form I-10	
When it has been determined that potential critical coarse sediment yield areas exist within the project site, the next step is to determine whether downstream systems would be sensitive to reduction of coarse sediment yield from the project site. Use this form to document the evaluation of downstream systems requirements for preservation of coarse sediment supply.				
Project Name:				
Project Tracking Number / Permit Application Number:				
1	Will the project discharge runoff to a hardened MS4 system (pipe or lined channel) or an un-lined channel?	☐ Hardened MS4 system	Go to 2	
		■ Un-lined channel	Go to 4	
2	Will the hardened MS4 system convey sediment (e.g., a concrete-lined channel with steep slope and cleansing velocity) or sink sediment (e.g., flat slopes, constrictions, treatment BMPs, or ponds with restricted outlets within the system will trap sediment and not allow conveyance of coarse sediment from the project site to an un-lined system).	☐ Convey	Go to 3	
		☐ Sink	Go to 7	
3	What kind of receiving water will the hardened MS4 system convey the sediment to?	☐ Un-lined channel	Go to 4	
		☐ Lake ☐ Reservoir ☐ Bay	Go to 7	
		☐ Lagoon ☐ Ocean	Go to 6	
4	Is the un-lined channel impacted by deposition of sediment? This condition must be documented by the local agency.	☐ Yes	Go to 7	
		■ No	Go to 5	

Form I-10 Page 2 of 2	
5	End – Preserve coarse sediment supply to protect un-lined channels from accelerated erosion due to reduction of coarse sediment yield from the project site unless further investigation determines the sediment is not critical to the receiving stream. Sediment that is critical to receiving streams is the sediment that is a significant source of bed material to the receiving stream (bed sediment supply) (see Section 6.2.3 and Appendix H.2 of the manual).
6	End – Provide management measures for preservation of coarse sediment supply (protect beach sand supply).
7	End – Downstream system does not warrant preservation of coarse sediment supply, no measures for protection of critical coarse sediment yield areas onsite are necessary. Use the space below to describe the basis for this finding for the project.

Placeholder – **6.2.3 Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite** (Optional)

Replace placeholder with required calculations/documentation.

Leave placeholder intact if not applicable.

Not Applicable

Placeholder – **6.3.4 Geomorphic Assessment of Receiving Channels** (Optional)

Replace placeholder with required calculations/documentation.

Leave placeholder intact if not applicable.

Not Applicable

Placeholder - **Flow Control Facility Design and Structural BMP Drawdown Calculations**

Replace placeholder with required calculations/documentation.

See Chapter 6 and Appendix G of the BMP Design Manual

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

RISER

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.83 ft
r = 0.42 ft

R = A/P
A = 0.54 ft^2
P = 2.61 ft
R = 0.21 ft

S = 100.00% = 1.000 ft/ft
n = 0.010

Q_{pipe} = 28.26 cfs

For Riser Q_{100} = 18.41 cfs

Q_{pipe} > Q_{100} Therefore, OK.

Placeholder – **Vector Control Plan** (required when structural BMPs will drain in 96 hours)

Replace placeholder with required documentation.

Leave placeholder intact if not applicable.

Not Applicable

ATTACHMENT 3
STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☒Included See Structural BMP Maintenance Information Checklist.
Attachment 3b	Draft Maintenance Agreement (when applicable)	☐Included ☒Not Applicable

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Preliminary Design / Planning / CEQA level submittal:

- Attachment 3a must identify:

☐Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual

- Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

Final Design level submittal:

Attachment 3a must identify:

☐Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
☐How to access the structural BMP(s) to inspect and perform maintenance
☐Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
☐Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
☐Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
☐Recommended equipment to perform maintenance
☐When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For private entity operation and maintenance, Attachment 3b shall include a draft maintenance agreement in the local jurisdiction's standard format (PDP applicant to contact the City Engineer to obtain the current maintenance agreement forms).

Placeholder – **Structural BMP Maintenance Information**

Replace placeholder with required documentation.

- Vegetation requirements including plant type, coverage, and minimum height when applicable shall be provided on the structural BMP and/or landscaping plans as appropriate or as required by the City Engineer.
- Signage indicating the location and boundary of the structural BMP is recommended.

When designing a structural BMP, the engineer should review the typical structural BMP maintenance actions listed in Section 7.7 to determine the potential maintenance equipment and access needs.

When selecting permanent structural BMPs for a project, the engineer and project owner should consider the long term cost of maintenance and what type of maintenance contracts a future property owner, homeowners association or property owners association will need to manage. The types of materials used (e.g. proprietary vs. non-proprietary parts), equipment used (e.g. landscape equipment vs. vactor truck), actions/labor expected in the maintenance process and required qualifications of maintenance personnel (e.g. confined space entry) affect the cost of long term O&M of the structural BMPs presented in the manual.

7.7 Maintenance Indicators and Actions for Structural BMPs

This Section presents typical maintenance indicators and expected maintenance actions (routine and corrective) for typical structural BMPs.

There are many different variations of structural BMPs, and structural BMPs may include multiple components. For the purpose of maintenance, the structural BMPs have been grouped into four categories based on common maintenance requirements:

- Vegetated infiltration or filtration BMPs
- Non-vegetated infiltration BMPs
- Non-vegetated filtration BMPs
- Detention BMPs

The project civil engineer is responsible for determining which categories are applicable based on the components of the structural BMP, and identifying the applicable maintenance indicators from within the category. Maintenance indicators and actions shall be shown on the construction plans and in the project-specific O&M Plan.

During inspection, the inspector checks the maintenance indicators. If one or more thresholds are met or exceeded, maintenance must be performed to ensure the structural BMP will function as designed during the next storm event.

7.7.1 Maintenance of Vegetated Infiltration or Filtration BMPs

"Vegetated infiltration or filtration BMPs" are BMPs that include vegetation as a component of the BMP. Applicable Fact Sheets may include INF-2 (bioretention), PR-1 (biofiltration with partial retention), BF-1 (biofiltration) or FT-1 (vegetated swale). The vegetated BMP may or may not include amended soils, subsurface gravel layer, underdrain, and/or impermeable liner. The project civil engineer is responsible for determining which maintenance indicators and actions shown below are applicable based on the components of the structural BMP.

7.7.2 Maintenance of Non-Vegetated Infiltration BMPs

"Non-vegetated infiltration BMPs" are BMPs that store storm water runoff until it infiltrates into the ground, and do not include vegetation as a component of the BMP (refer to the "vegetated BMPs" category for infiltration BMPs that include vegetation). Non-vegetated infiltration BMPs generally include non-vegetated infiltration trenches and infiltration basins, dry wells, underground infiltration galleries, and permeable pavement with underground infiltration gallery. Applicable Fact Sheets may include INF-1 (infiltration basin) or INF-3 (permeable pavement). The non-vegetated infiltration BMP may or may not include a pre-treatment device, and may or may not include above-ground storage of runoff. The project civil engineer is responsible for determining which maintenance indicators and actions shown below are applicable based on the components of the structural BMP.

TABLE 7-2. Maintenance Indicators and Actions for Vegetated BMPs

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. a vegetated swale may require a minimum vegetation height).
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.
Standing water in vegetated swales	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Standing water in bioretention, biofiltration with partial retention, or biofiltration areas, or flow-through planter boxes for longer than 96 hours following a storm event*	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains (where applicable), or repairing/replacing clogged or compacted soils.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.
*These BMPs typically include a surface ponding layer as part of their function which may take 96 hours to drain following a storm event.	

TABLE 7-3. Maintenance Indicators and Actions for Non-Vegetated Infiltration BMPs

Typical Maintenance Indicator(s) for Non-Vegetated Infiltration BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris in infiltration basin, pre-treatment device, or on permeable pavement surface	Remove and properly dispose accumulated materials.
Standing water in infiltration basin without subsurface infiltration gallery for longer than 96 hours following a storm event	Remove and replace clogged surface soils.
Standing water in subsurface infiltration gallery for longer than 96 hours following a storm event	This condition requires investigation of why infiltration is not occurring. If feasible, corrective action shall be taken to restore infiltration (e.g. flush fine sediment or remove and replace clogged soils). BMP may require retrofit if infiltration cannot be restored. If retrofit is necessary, the City Engineer shall be contacted prior to any repairs or reconstruction.
Standing water in permeable paving area	Flush fine sediment from paving and subsurface gravel. Provide routine vacuuming of permeable paving areas to prevent clogging.
Damage to permeable paving surface	Repair or replace damaged surface as appropriate.
Note: When inspection or maintenance indicates sediment is accumulating in an infiltration BMP, the DMA draining to the infiltration BMP should be examined to determine the source of the sediment, and corrective measures should be made as applicable to minimize the sediment supply.	

7.7.3 Maintenance of Non-Vegetated Filtration BMPs

"Non-vegetated filtration BMPs" include media filters (FT-2) and sand filters (FT-3). These BMPs function by passing runoff through the media to remove pollutants. The project civil engineer is responsible for determining which maintenance indicators and actions shown below are applicable based on the components of the structural BMP.

TABLE 7-4. Maintenance Indicators and Actions for Filtration BMPs

Typical Maintenance Indicator(s) for Filtration BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose accumulated materials.
Obstructed inlet or outlet structure	Clear obstructions.
Clogged filter media	Remove and properly dispose filter media, and replace with fresh media.
Damage to components of the filtration system	Repair or replace as applicable.
Note: For proprietary media filters, refer to the manufacturer's maintenance guide.	

7.7.4 Maintenance of Detention BMPs

"Detention BMPs" includes basins, cisterns, vaults, and underground galleries that are primarily designed to store runoff for controlled release to downstream systems. For the purpose of the maintenance discussion, this category does not include an infiltration component (refer to "vegetated infiltration or filtration BMPs" or "non-vegetated infiltration BMPs" above). Applicable Fact Sheets may include HU-1 (cistern) or FT-4 (extended detention basin). There are many possible configurations of above ground and underground detention BMPs, including both proprietary and non-proprietary systems. The project civil engineer is responsible for determining which maintenance indicators and actions shown below are applicable based on the components of the structural BMP.

TABLE 7-5. Maintenance Indicators and Actions for Detention BMPs

Typical Maintenance Indicator(s) for Detention Basins	Maintenance Actions
Poor vegetation establishment	Re-seed, re-establish vegetation.
Overgrown vegetation	Mow or trim as appropriate.
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or re-grading where necessary.
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials.
Standing water	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, or minor re-grading for proper drainage.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.

ATTACHMENT 4
Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.

Use this checklist to ensure the required information has been included on the plans:

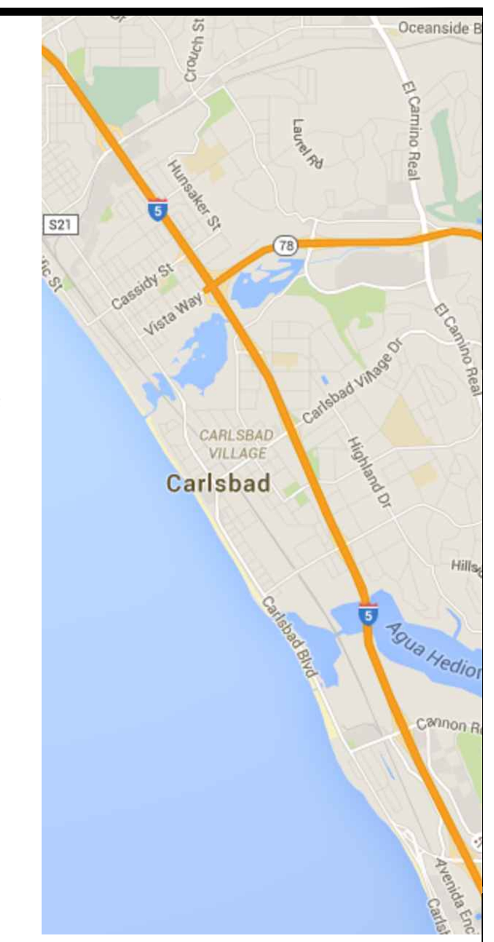
The plans must identify:

☐Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
☐The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
☐Details and specifications for construction of structural BMP(s)
☐Signage indicating the location and boundary of structural BMP(s) as required by the City Engineer
☐How to access the structural BMP(s) to inspect and perform maintenance
☐Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
☐Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
☐Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
☐Recommended equipment to perform maintenance
☐When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
☐Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
☐All BMPs must be fully dimensioned on the plans
☐When proprietery BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Broucher photocopies are not allowed.

PRELIMINARY SITE PLAN
OCEAN HILLS SENIOR LIVING FACILITY - PHASE 2

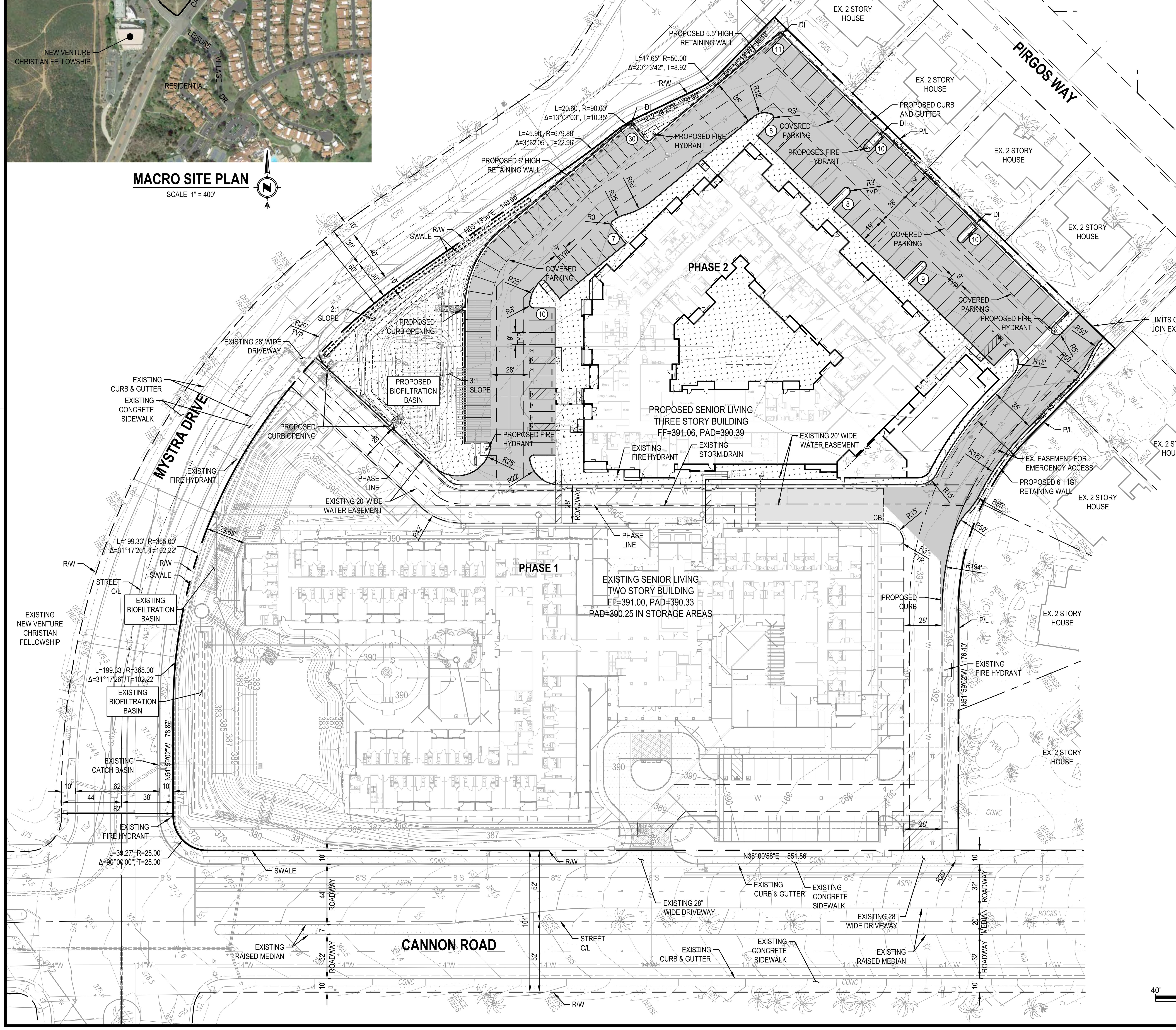
4500 CANNON ROAD, OCEANSIDE, CA 92056

MACRO SITE PLAN
SCALE 1" = 400'



LEGAL DESCRIPTION:

LOT 70 OF LEISURE GLEN, IN THE CITY OF OCEANSIDE, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF No. 12495, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY ON NOVEMBER 8, 1989.



LEGEND:

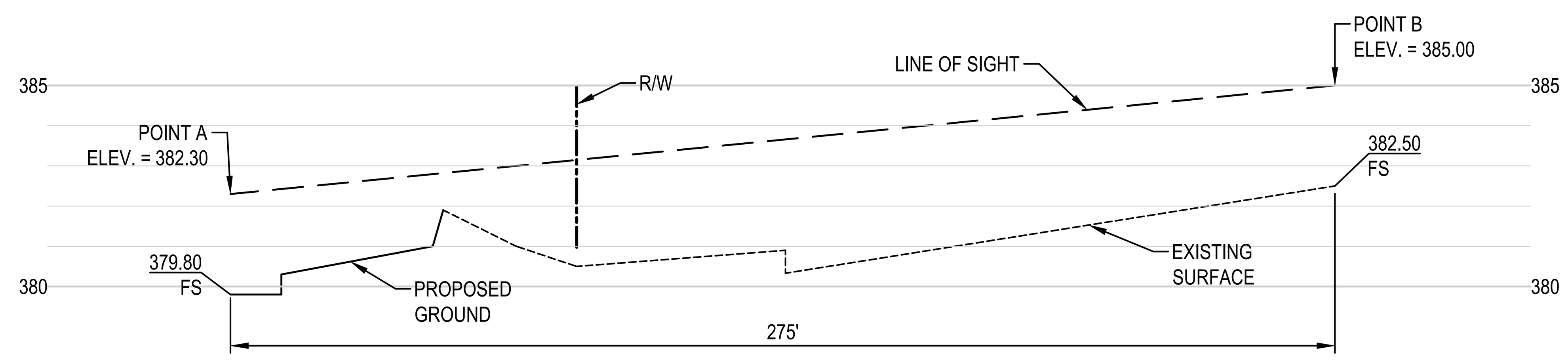
	NEW PCC SIDEWALK
	NEW AC PAVEMENT OVERLAY
	NEW AC PAVEMENT
	LANDSCAPE AREA
	BIORETENTION AREA
	R/W OR P/L
	PHASE LINE
	EASEMENT LINE
	CURB
	CURB AND GUTTER
W	WATER LINE
S	SEWER LINE
SD	STORM DRAIN LINE

ABBREVIATIONS:

AC	ASPHALT CONCRETE
EX.	EXISTING
FF	FINISHED FLOOR
MAX.	MAXIMUM
MIN.	MINIMUM
P/L	PROPERTY LINE
R/W	RIGHT OF WAY

40' 20' 0 40' 80'
SCALE: 1" = 40'

SIT
SITE
PHAS
PHAS
TOTA
FLO
PROP
(PER
SETI
ZON
APN
LAN
RESI
SENIC
LAN
MINIM
LAND
LAND
BUIL
BUILD
UNIT
ALF-0
ALF-1
ALF-1
ALF-1
ALF-1
ALF-1
ALF-1
ALF-1
ALF-1
ALF-1
ALF-2
ALF-2
TOTA
GROS
1ST F
2ND F
3RD F
BUILD
FAR
LOT
HEIG
PAR
OFF-S
1 PAR
TOTA
PARK
STAN
ACCE
VAN A
ELEC
AMC



LINE OF SIGHT PROFILE NO. 1

HORIZONTAL SCELE: 1" = 30'

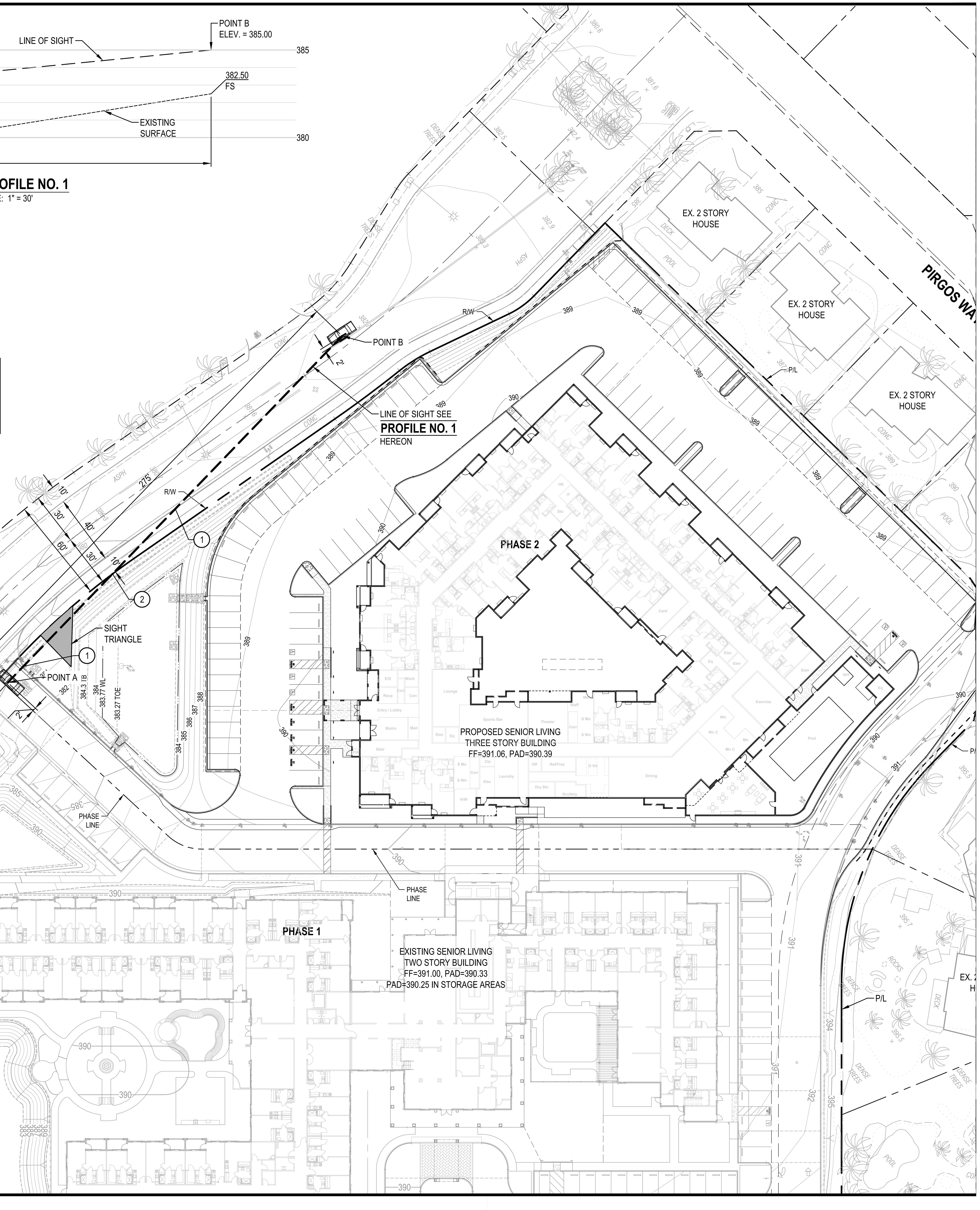
CLEAR SPACE EASEMENT MARKERS:

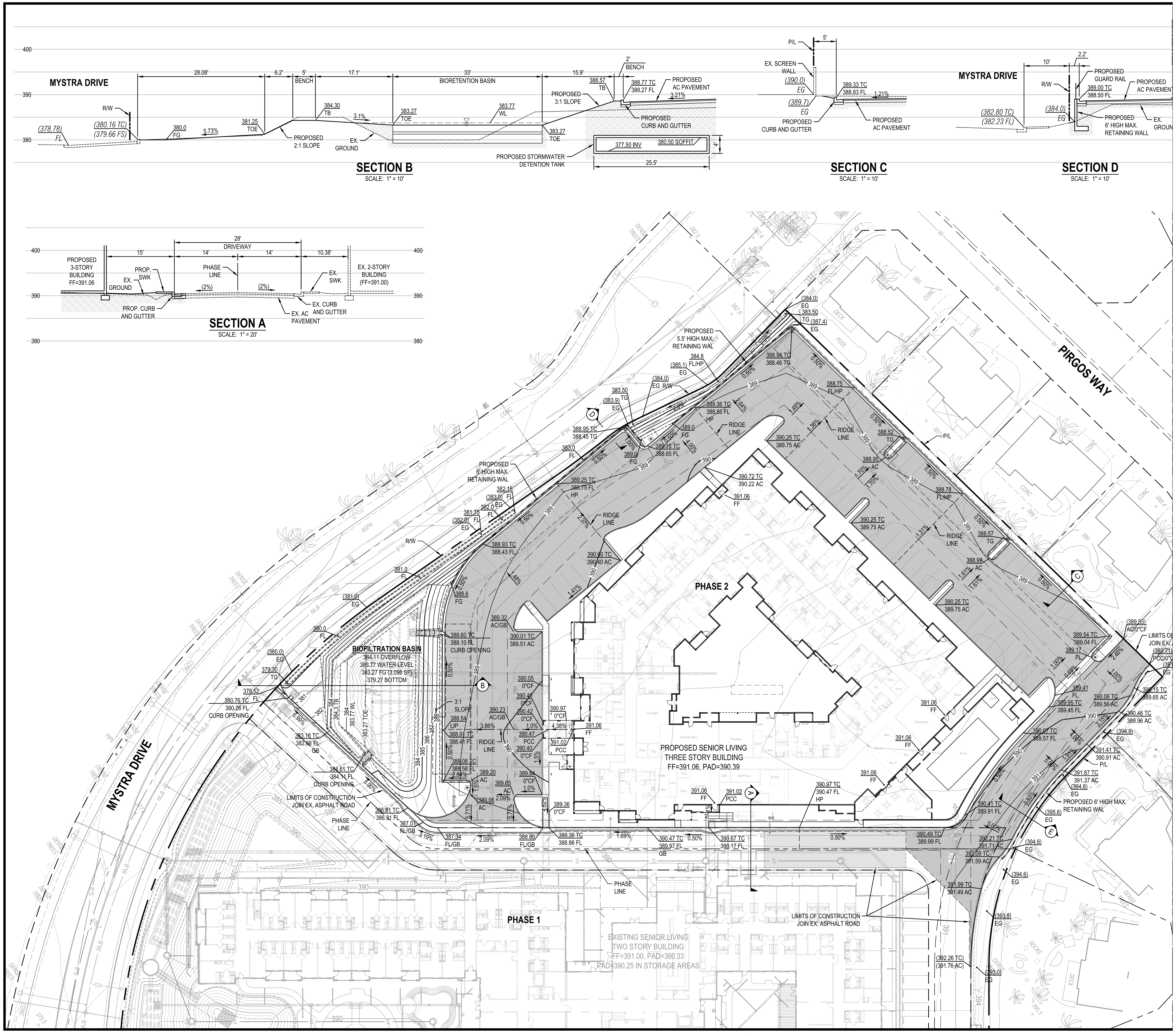
(1) -SET IN CURB TYPE 1 - BRONZE MARKER PER SAN DIEGO COUNTY DESIGN STANDARD DWG. NO. DS-16.

(2) -SET IN CONCRETE IN 2" DIA. x 24" LONG GALVANIZED STEEL PIPE TYPE 2 - BRONZE MARKER PER SAN DIEGO COUNTY DESIGN STANDARD DWG. NO. DS-16.

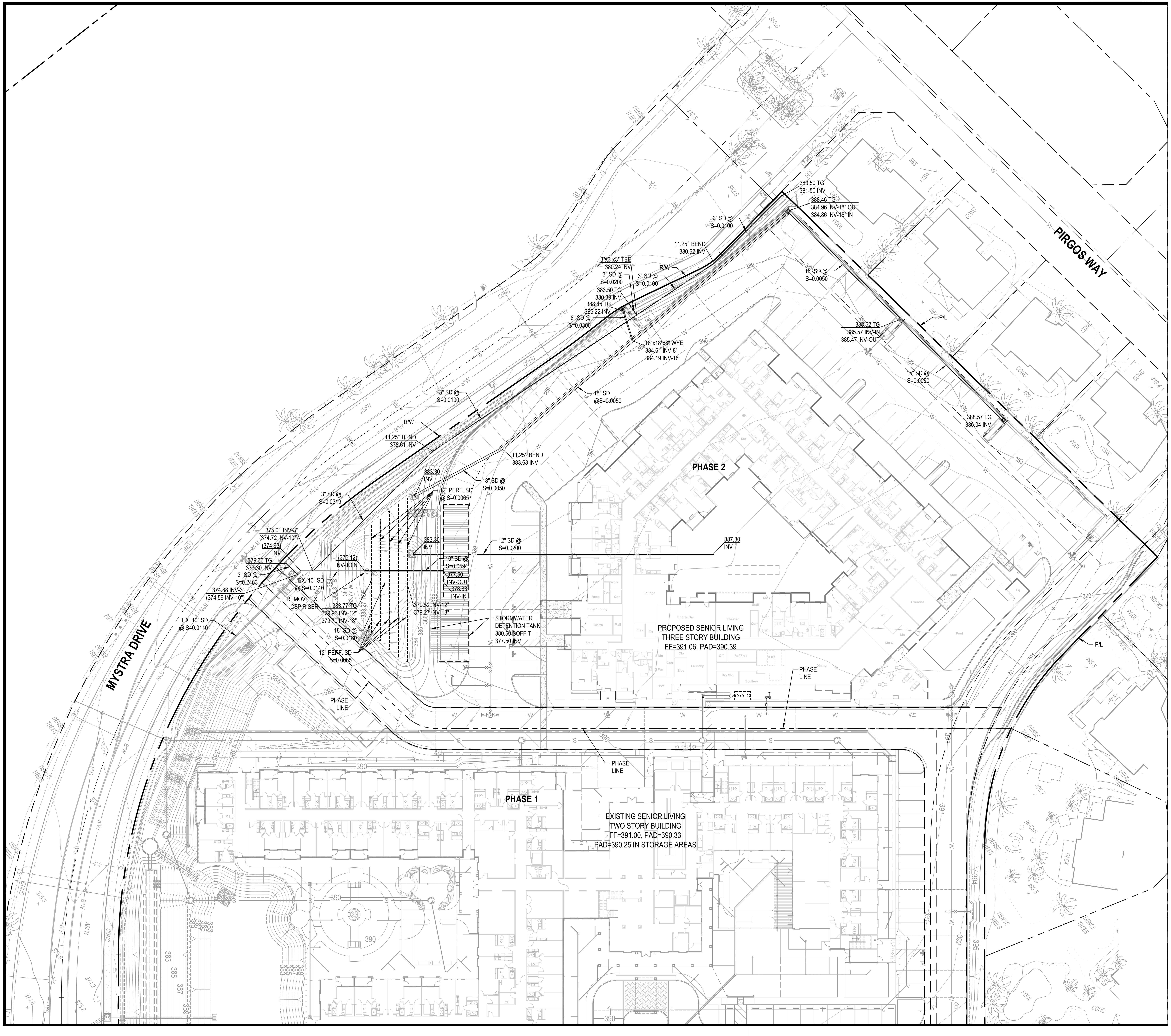
NOTES:

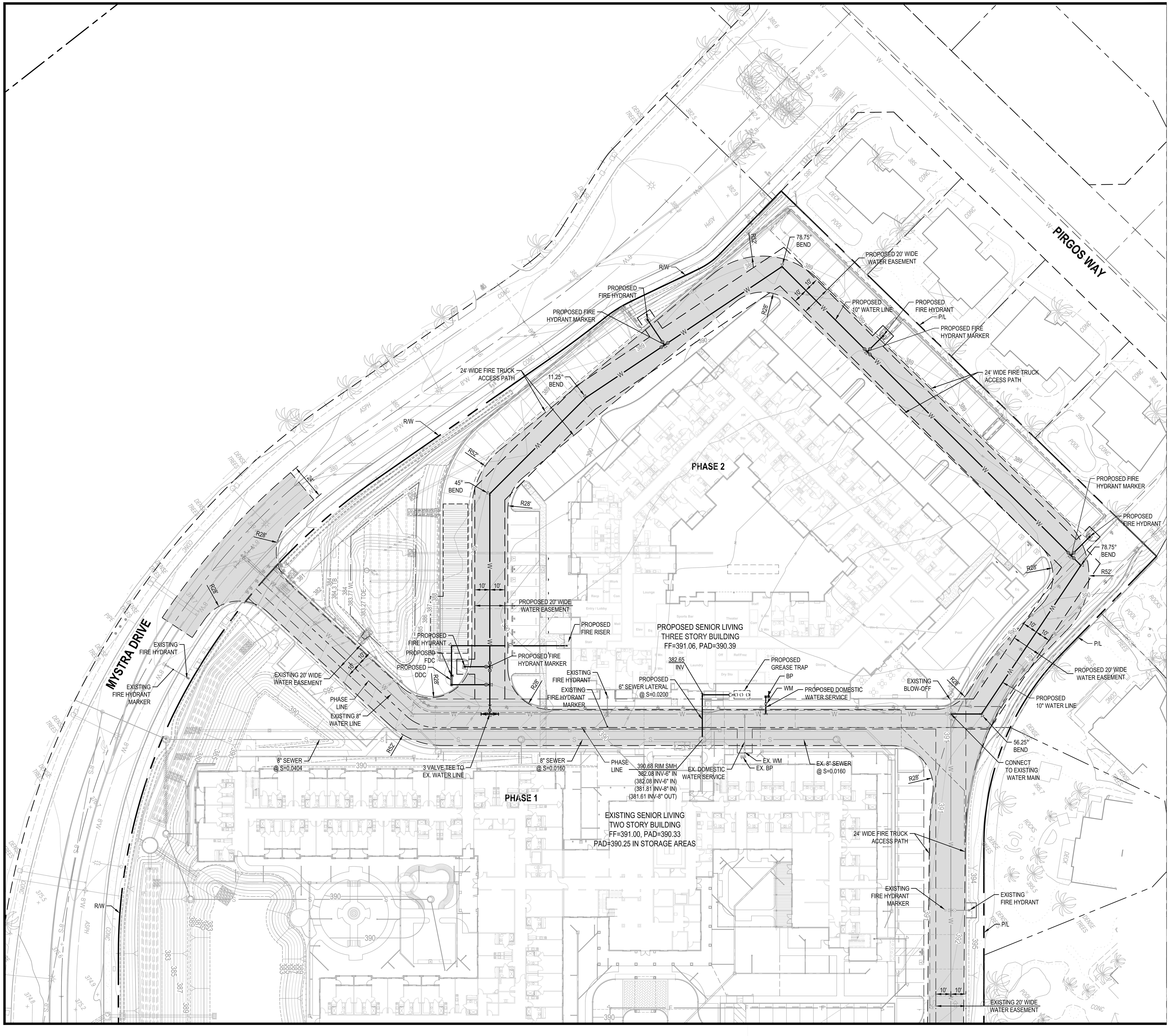
1. ENSURE THAT THERE WILL BE NO LANDSCAPING OR UTILITY STRUCTURES AFFECTING LINE OF SIGHT.
2. ONSITE STRIPING AND SIGNAGE PER SEPARATE ONSITE IMPROVEMENT PLANS.





MYSTRA DRIVE
BIORETENTION BASIN
PROPOSED STORMWATER DETENTION TANK
SECTION B
SCALE: 1" = 10'
SECTION C
SCALE: 1" = 10'
SECTION D
SCALE: 1" = 10'
SECTION A
SCALE: 1" = 20'
PROPOSED 3-STORY BUILDING FF=391.06
EX. 2-STORY BUILDING (FF=391.00)
DRIVEWAY
PHASE LINE
PIRGOS WAY
MYSTRA DRIVE
PHASE 2
BIOFILTRATION BASIN
384.11 OVERFLOW
383.77 WATER LEVEL
383.27 FG (3,096 SF)
379.27 BOTTOM
PROPOSED SENIOR LIVING
THREE STORY BUILDING
FF=391.06, PAD=390.39
PHASE 1
EXISTING SENIOR LIVING
TWO STORY BUILDING
FF=391.00, PAD=390.33
PAD=390.25 IN STORAGE AREAS
LIMITS OF CONSTRUCTION
JOIN EX. ASPHALT ROAD
PROPOSED 6' HIGH MAX. RETAINING WAL
PROPOSED 5.5' HIGH MAX. RETAINING WAL
RIDGE LINE


MYSTRA DRIVE
PIRGOS WAY
PHASE 2
PROPOSED SENIOR LIVING
THREE STORY BUILDING
FF=391.06, PAD=390.39
PHASE 1
EXISTING SENIOR LIVING
TWO STORY BUILDING
FF=391.00, PAD=390.33
PAD=390.25 IN STORAGE AREAS
STORMWATER
DETENTION TANK
380.50 SOFFIT
377.50 INV
PHASE
LINE
EX. 10" SD
@ S=0.0110
REMOVE EX.
CSP RISER
12" PERF. SD
S=0.0065
18" SD @
S=0.0050
12" SD @
S=0.0200
387.30
INV
11.25° BEND
378.81 INV
11.25° BEND
380.62 INV
11.25° BEND
383.63 INV
15" SD @
S=0.0050
388.52 TG
385.57 INV-IN
385.47 INV-OUT
388.57 TG
386.04 INV
383.50 TG
381.50 INV
388.46 TG
384.96 INV-18" OUT
384.86 INV-15" IN
18"x18"x8" WYE
384.61 INV-8"
384.19 INV-18"
R/W
P/L



MYSTRA DRIVE
PIRGOS WAY
PHASE 2
PHASE 1
PROPOSED SENIOR LIVING
THREE STORY BUILDING
FF=391.06, PAD=390.39
EXISTING SENIOR LIVING
TWO STORY BUILDING
FF=391.00, PAD=390.33
PAD=390.25 IN STORAGE AREAS
78.75° BEND
PROPOSED 20' WIDE WATER EASEMENT
PROPOSED 10" WATER LINE
PROPOSED FIRE HYDRANT
P/L
PROPOSED FIRE HYDRANT MARKER
24' WIDE FIRE TRUCK ACCESS PATH
R/W
11.25° BEND
45° BEND
R52'
R28'
R26'
10'
PROPOSED FIRE RISER
PROPOSED FDC
PROPOSED DDC
EXISTING FIRE HYDRANT
EXISTING FIRE HYDRANT MARKER
EXISTING 20' WIDE WATER EASEMENT
PHASE LINE
EXISTING 8" WATER LINE
382.65 INV
PROPOSED 6" SEWER LATERAL @ S=0.0200
PROPOSED GREASE TRAP
BP
WM
PROPOSED DOMESTIC WATER SERVICE
EXISTING BLOW-OFF
56.25° BEND
CONNECT TO EXISTING WATER MAIN
8" SEWER @ S=0.0404
3 VALVE TEE TO EX. WATER LINE
8" SEWER @ S=0.0160
390.68 RIM SMH
382.08 INV-6" IN
(382.08 INV-6" IN)
(381.81 INV-8" IN)
(381.61 INV-8" OUT)
EX. DOMESTIC WATER SERVICE
EX. WM
EX. BP
EX. 8" SEWER @ S=0.0160
EXISTING 20' WIDE WATER EASEMENT

Placeholder – **Stormwater BMP Plan Sheet(s)**

Replace placeholder with plan sheet(s).

Site Design & Landscape Planning SD-10

Design Objectives

- ✓ Maximize Infiltration
- ✓ Provide Retention
- ✓ Slow Runoff
- ✓ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

CASQA
California Stormwater Quality Association

Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.

- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.

- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.

- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.

- Promote natural vegetation by using parking lot islands and other landscaped areas.

- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.

- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Design Objectives

- ✓ Maximize Infiltration
- ✓ Provide Retention
- ✓ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

CASQA California Stormwater Quality Association

- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ✓ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING –

CASQA California Stormwater Quality Association

DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.
- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ✓ Contain Pollutants
- Collect and Convey

Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.

- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

CASQA California Stormwater Quality Association

- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Maintenance Concerns, Objectives, and Goals

- Clogged Soil or Outlet Structures
- Invasive Species
- Vegetation/Landscape Maintenance
- Erosion
- Channelization of Flow
- Aesthetics

General Description

The bioretention best management practice (BMP) functions as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. These facilities normally consist of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. The runoff's velocity is reduced by passing over or through a sand bed and is subsequently distributed evenly along a ponding area. Exfiltration of the stored water in the bioretention area planting soil into the underlying soils occurs over a period of days.

Inspection/Maintenance Considerations

Bioretention requires frequent landscaping maintenance, including measures to ensure that the area is functioning properly, as well as maintenance of the landscaping on the practice. In many cases, bioretention areas initially require intense maintenance, but less maintenance is needed over time. In many cases, maintenance tasks can be completed by a landscaping contractor, who may already be hired at the site. In cold climates the soil may freeze, preventing runoff from infiltrating into the planting soil.

Targeted Constituents

✓	Sediment	■
✓	Nutrients	▲
✓	Trash	■
✓	Metals	■
✓	Bacteria	■
✓	Oil and Grease	■
✓	Organics	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

Inspection Activities	Suggested Frequency
■ Inspect soil and repair eroded areas.	Monthly
■ Inspect for erosion or damage to vegetation, preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the strips are ready for winter. However, additional inspection after periods of heavy runoff is desirable.	Semi-annual inspection
■ Inspect to ensure grass is well established. If not, either prepare soil and reseed or replace with alternative species. Install erosion control blanket. ■ Check for debris and litter, and areas of sediment accumulation. ■ Inspect health of trees and shrubs.	

Maintenance Activities	Suggested Frequency
■ Water plants daily for 2 weeks.	At project completion
■ Remove litter and debris.	Monthly
■ Remove sediment. ■ Remulch void areas. ■ Treat diseased trees and shrubs. ■ Mow turf areas. ■ Repair erosion at inflow points. ■ Repair outflow structures. ■ Unclog underdrain. ■ Regulate soil pH regulation.	As needed
■ Remove and replace dead and diseased vegetation.	Semi-annual
■ Add mulch. ■ Replace tree stakes and wires.	Annual
■ Mulch should be replaced every 2 to 3 years or when bare spots appear. Remulch prior to the wet season.	Every 2-3 years, or as needed

Additional Information

Landscaping is critical to the function and aesthetic value of bioretention areas. It is preferable to plant the area with native vegetation, or plants that provide habitat value, where possible. Another important design feature is to select species that can withstand the hydrologic regime they will experience. At the bottom of the bioretention facility, plants that tolerate both wet and dry conditions are preferable. At the edges, which will remain primarily dry, upland species will be the most resilient. It is best to select a combination of trees, shrubs, and herbaceous materials.

References

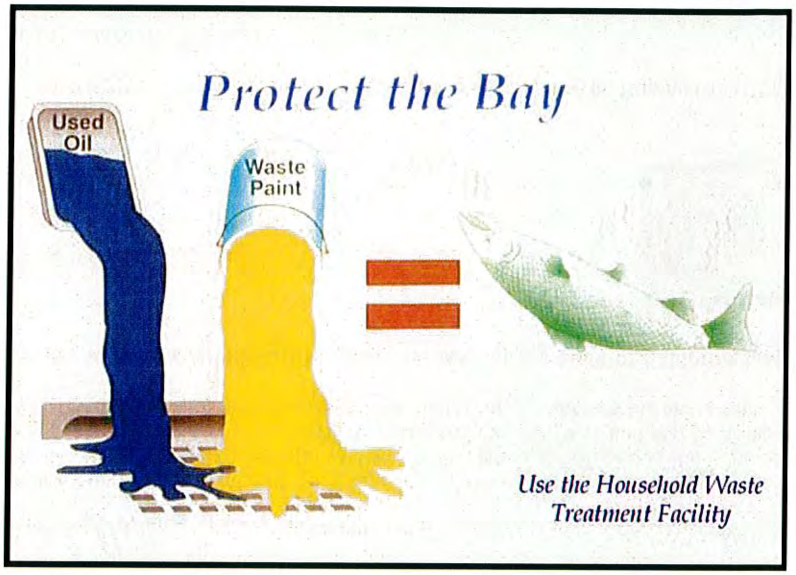
Metropolitan Council, Urban Small Sites Best Management Practices Manual. Available at: http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July, 1998, revised February, 2002.

U.S. Environmental Protection Agency, Post-Construction Stormwater Management in New Development & Redevelopment BMP Factsheets. Available at: cfpub.epa.gov/npdes/stormwater/menuofbmps/bmp_files.cfm

Ventura Countywide Stormwater Quality Management Program, Technical Guidance Manual for Stormwater Quality Control Measures. July, 2002.

Non-Stormwater Discharges SC-10



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓

CASQA
California Stormwater Quality Association

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, air conditioner condensate, etc. However there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants into storm drains. They can generally be detected through a combination of detection and elimination. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges of pollutants on streets and into the storm drain system and creeks.

Approach

Initially the industry must make an assessment of non-stormwater discharges to determine which types must be eliminated or addressed through BMPs. The focus of the following approach is in the elimination of non-stormwater discharges.

Pollution Prevention

- Ensure that used oil, used antifreeze, and hazardous chemical recycling programs are being implemented. Encourage litter control.

Suggested Protocols

Recommended Complaint Investigation Equipment

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms
  - Educational materials

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially those that are not classified as hazardous. These are often not responded to as effectively as they need to be.
- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled or demarcated next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.

- See SC44 Stormwater Drainage System Maintenance for additional information.

Illicit Connections

- Locate discharges from the industrial storm drainage system to the municipal storm drain system through review of "as-built" piping schematics.
- Isolate problem areas and plug illicit discharge points.
- Locate and evaluate all discharges to the industrial storm drain system.

Visual Inspection and Inventory

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for a day or two following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- A review of the "as-built" piping schematic is a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.
- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Drainage System

- TV Cameras can be employed to visually identify illicit connections to the industrial storm drainage system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.

- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Once a site has been cleaned:

- Post "No Dumping" signs with a phone number for reporting dumping and disposal.
- Landscaping and beautification efforts of hot spots may also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.
- See fact sheet SC11 Spill Prevention, Control, and Cleanup.

Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Conduct field investigations of the industrial storm drain system for potential sources of non-stormwater discharges.
- Pro-actively conduct investigations of high priority areas. Based on historical data, prioritize specific geographic areas and/or incident type for pro-active investigations.

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained, and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any on-site drainage points observed.
- Document and report annually the results of the program.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Training

- Training of technical staff in identifying and documenting illegal dumping incidents is required.
- Consider posting the quick reference table near storm drains to reinforce training.
- Train employees to identify non-stormwater discharges and report discharges to the appropriate departments.

- Educate employees about spill prevention and cleanup.

- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.

- Determine and implement appropriate outreach efforts to reduce non-permissible non-stormwater discharges.

- Conduct spill response drills annually (if no events occurred to evaluate your plan) in cooperation with other industries.

- When a responsible party is identified, educate the party on the impacts of his or her actions.

Spill Response and Prevention

- See SC11 Spill Prevention Control and Cleanup.

Other Considerations

- Many facilities do not have accurate, up-to-date schematic drawings.

Requirements

Costs (including capital and operation & maintenance)

- The primary cost is for staff time and depends on how aggressively a program is implemented.

- Cost for containment and disposal is borne by the discharger.

- Illicit connections can be difficult to locate especially if there is groundwater infiltration.

- Indoor floor drains may require re-plumbing if cross-connections to storm drains are detected.

Maintenance (including administrative and staffing)

- Illegal dumping and illicit connection violations requires technical staff to detect and investigate them.

Supplemental Information

Further Detail of the BMP

Illegal Dumping

- Substances illegally dumped on streets and into the storm drain systems and creeks include paints, used oil and other automotive fluids, construction debris, chemicals, fresh concrete, leaves, grass clippings, and pet wastes. All of these wastes cause stormwater and receiving water quality problems as well as clog the storm drain system itself.

- Establish a system for tracking incidents. The system should be designed to identify the following:

  - Illegal dumping hot spots

- Types and quantities (in some cases) of wastes
- Patterns in time of occurrence (time of day/night, month, or year)
- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
- Responsible parties

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people at the facility who are aware of the problem and who have the tools to at least identify the incident, if not correct it. Therefore, train field staff to recognize and report the incidents.

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges to the stormwater collection system may include any water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Facilities subject to stormwater permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The State's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Performance Evaluation

- Review annually internal investigation results; assess whether goals were met and what changes or improvements are necessary.
- Obtain feedback from personnel assigned to respond to, or inspect for, illicit connections and illegal dumping incidents.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Spill Prevention, Control & Cleanup SC-11

Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental or illegal spills. Preparation for accidental or illegal spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify potential spill areas, specify material handling procedures, describe spill response procedures, and provide spill clean-up equipment. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills.

Approach

Pollution Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- Develop a Spill Prevention Control and Countermeasure (SPCC) Plan. The plan should include:

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Description of the facility, owner and address, activities and chemicals present
- Facility map
- Notification and evacuation procedures
- Cleanup instructions
- Identification of responsible departments
- Identify key spill response personnel

■ Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

Suggested Protocols (including equipment needs)

Spill Prevention

■ Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

■ If consistent illegal dumping is observed at the facility:

- Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
- Landscaping and beautification efforts may also discourage illegal dumping.
- Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

■ Store and contain liquid materials in such a manner that if the tank is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

■ If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

■ Routine maintenance:

- Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.
- Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
- Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain.*

- Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- Label all containers according to their contents (e.g., solvent, gasoline).

- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).

- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).

- Identify key spill response personnel.

Spill Control and Cleanup Activities

- Follow the Spill Prevention Control and Countermeasure Plan.

- Clean up leaks and spills immediately.

- Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).

- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.

- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.

- Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.

- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Reporting

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board.

- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).

- Report spills to local agencies, such as the fire department; they can assist in cleanup.

- Establish a system for tracking incidents. The system should be designed to identify the following:

  - Types and quantities (in some cases) of wastes

  - Patterns in time of occurrence (time of day/night, month, or year)

  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)

  - Responsible parties

Training

- Educate employees about spill prevention and cleanup.

- Well-trained employees can reduce human errors that lead to accidental releases or spills:

  - The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.

- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.

- Train employees to recognize and report illegal dumping incidents.

Other Considerations (Limitations and Regulations)

- A Spill Prevention Control and Countermeasure Plan (SPCC) is required for facilities that are subject to the oil pollution regulations specified in Part 112 of Title 40 of the Code of Federal Regulations or if they have a storage capacity of 10,000 gallons or more of petroleum. (Health and Safety Code 6.67)

- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.

- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Requirements

Costs (including capital and operation & maintenance)

- Will vary depending on the size of the facility and the necessary controls.

- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

Maintenance (including administrative and staffing)

- This BMP has no major administrative or staffing requirements. However, extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

Supplemental Information

Further Detail of the BMP

Reporting

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident
- Weather conditions
- Duration of the spill/leak/discharge
- Cause of the spill/leak/discharge
- Response procedures implemented
- Persons notified
- Environmental problems associated with the spill/leak/discharge

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- The date and time the inspection was performed
- Name of the inspector
- Items inspected
- Problems noted
- Corrective action required
- Date corrective action was taken

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

Aboveground Tank Leak and Spill Control

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)
- External corrosion and structural failure
- Spills and overfills due to operator error
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.

- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.
- Periodically conduct integrity testing by a qualified professional.

Vehicle Leak and Spill Control
Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.

- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:
  - Cover fueling area if possible.
  - Use a perimeter drain or slope pavement inward with drainage to a sump.
  - Pave fueling area with concrete rather than asphalt.
- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage "topping-off" of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use adsorbent materials on small spills and general cleaning rather than hosing down the area. Remove the adsorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

Industrial Spill Prevention Response

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities. The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department)
- Develop procedures to prevent/mitigate spills to storm drain systems
- Identify responsible departments
- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures
- Address spills at municipal facilities, as well as public areas

- Provide training concerning spill prevention, response and cleanup to all appropriate personnel

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net/

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:

  - Immediate repair of any deterioration threatening structural integrity.

  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.

  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

CASQA California Stormwater Quality Association

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System
- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations
- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel
- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges
- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).

- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.

- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.

- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.

- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.

- Regulations may include adoption of substantial penalties for illegal dumping and disposal.

- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.

- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:

  - Purchase and installation of signs.

  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.

  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.

  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

ATTACHMENT 5
Drainage Report

This is the cover sheet for Attachment 5.

Placeholder – **Drainage Report**

Replace placeholder with drainage report.

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

HYDROLOGY REPORT

For

OCEAN HILLS ALF – PHASE II

4500 CANNON ROAD

OCEANSIDE, CA

Prepared For:

PROTEA SENIOR LIVING OCEANSIDE, LLC.

18 VENTANA RIDGE DR.

Aliso Viejo, CA 92656

Prepared By:

Waber Consultants
PLANNING CIVIL ENGINEERING SURVEYING
INC

Waber Consultants, Inc.

3711 Long Beach Blvd, Suite 1008

Long Beach, CA 90807

(562) 426-8283

January 2019

Table of Contents

Tables

Appendices

Appendix A – Hydrology Calculations

Appendix B – Hydraulics Calculations

Appendix C – Reference Figures and Tables

Appendix D –Hydrology Maps

Appendix E – Hydromodification Calculations

1.0 Scope

Hydrologic calculations to evaluate surface runoff associated with 2-, 10-, 50-, and 100-year hypothetical design storm frequencies from the tributary drainage areas were performed. Hydrologic parameters used in the analysis, such as rainfall and soil classification are presented in the *San Diego County Hydrology Manual, June 2003* (Hydrology Manual).

Hydraulics calculations to evaluate pipe sizes to handle the 100-year storm event were performed using the Manning's equation.

Hydraulics calculations based on Hazen-Williams Equation was used in the sizing of dual sump pump system based on the 10-year storm event flow.

Detention basin including its riser sizing calculations were performed based on hydromodification calculations to mitigate the 2-year to 10-year storm flows and volumes using the San Diego Hydrology Model (SDHM) 3.0 Model software.

Biofiltration basins have been sized to treat the Design Capture Volume (DCV) for the site per the current Storm Water Quality Mitigation Plan, Regional Water Quality Control Board, and MS4 Permit requirements.

2.0 Project Description

2.1. Existing Conditions

The subject property is located at 4500 Cannon Road in Oceanside, California. The site consists of a relatively level 6.46-acre property that is currently a vacant lot. The property is bounded by Mystra Drive to the west, and a residential subdivision to the north and east. The site is being developed in two separate phases. Phase 1 has already been developed. This report is for Phase 2 of the development. Phase 1 is the southern portion of the lot and is 3.53 acres in size. Phase 2 is the northern portion of the lot and is 2.93 acres in size.

The existing project site has been rough graded and is relatively flat. It slopes in a generally south westerly direction into two existing drain inlets, located at the southwestern part of the site, that tie-in to existing 24” pipe. The pipe ties-in to existing curb catch basin in Mystra Drive. The subject property is bound by property walls to the north and east and, therefore, does not have upstream off-site run on.

2.2. Proposed Conditions

The proposed project is located in Phase 2 of the development and is located in the northern portion of the site. It consists of construction of a new 37,379 SF footprint 3-story assisted living facility building, new drive aisle, parking stalls, landscape areas including biofiltration basins, and underground detention tanks.

The proposed project is considered a Priority Development Project and permanent BMPs are required for treatment of storm water runoff. A separate Storm Water Quality Management Plan (SWQMP) has been prepared addressing the treatment of storm water runoff requirements including biofiltration and hydromodification.

All roof runoff is conveyed into the proposed onsite storm drain system. Surface drainage in the landscape and hardscape areas eventually drain into the proposed storm drain system. The storm drain system is routed to eventually drain onto the proposed biofiltration basin. Overflow drains in the biofiltration basins are routed to underground detention tanks located under the parking lot. Overflow from the detention tanks will drain into existing curb inlet catch basin in Mystra Drive to drain into the existing municipal storm drain system.

The proposed project is bound by existing property walls to the north and east it does not have upstream off-site run on.

3.0 Hydrology

3.1 Methodology

The hydrologic calculations to determine the 2-, 10-, 50-, and 100-year peak flow rates were performed using the criteria in the *San Diego County Hydrology Manual*. The Rational Method is an empirical computation procedure for developing a peak runoff rate (discharge) for storms of a specific recurrence interval. Rational Method equations are based on the assumption that the peak flow rate is directly proportional to the drainage area, rainfall intensity, and a loss rate coefficient, which describes the effects of land use and soil type. The Rational Method flow rates were computed by generating a hydrologic "link-node" model, which divides the area into drainage subareas. Please see Appendix A for hydrology calculations.

3.2 Areas

Hydrology Maps are included in this report delineating the drainage subareas. Areas are provided in the maps in both square feet (SF) and acres (AC). AC units are used in the rational method calculations.

3.3 Soil

Per soil report prepared by EEI, Inc. and dated October 29, 2018, the site is underlain by soil classified as dark brown sandy clay and reddish brown clayey sand (USCS “CL” and “SC”). This soil is underlain by shallow bedrock with varying depths across the site at approximately 2’ to 15’ depth below existing ground surface. Therefore, Soil Type D was selected for the hydrology analysis. The project site is located 33^{o}09’55” N, 117^{o}16’08” W per U.S. State Plane Coordinates. Hydrologic Soil Map found in Appendix A of the Hydrology Manual is included in Appendix C of this report for reference. Project is located within Soil B area indicated in the map.

3.4 Runoff Coefficient

The runoff coefficients are based on land use and soil type. The appropriate runoff coefficient (C) was determined by applying the equation provided in Page 3-5 and C_p values presented in Table 3-1 of the Hydrology Manual. Table 3-1 is included in Appendix C of this report for reference.

3.5 Precipitation

The 6-hr and 24-hr precipitation for the 2-, 10-, 50-, and 100-yr storm events was obtained from the Isopluvial Maps located in Appendix B of the Hydrology Manual. The hydrology manual requires the 6-hr precipitation to be within the range of 45% to 65% of the 24 - hr precipitation. The calculated 6-hr precipitation both the 50- and 100-year storm events fall within the required range and is summarized in Table 1 below. Therefore, no adjustments are required.

Table 1 - Precipitation Values

Storm Event	P_6, 6-hr Precipitation (in.)	P_{24}, 24-hr Precipitation (in.)	P_6/P_{24} (%)
2-yr	1.4	2.2	63.6
10-yr	2.0	3.5	57.1
50-yr	2.5	4.5	55.6
100-yr	3.0	5.0	60.0

3.6 Time of Concentration

The Time of Concentration (T_c) is the time required for runoff to flow from the most remote part of the drainage area to the point of interest. The T_c (minutes) is based on slope and runoff coefficient and it was obtained using the equation provided in Figure 3-3 of the Hydrology Manual, and it is included in Appendix C of this report for reference.

3.7 Rainfall Intensity

The rainfall intensity is the rainfall in inches per hour (in/hr) for a duration equal to the T_c for a selected storm frequency. Intensity is dependent on 6-hour precipitation and T_c. It was obtained using the equation provided in Page 3-7 of the Hydrology Manual.

3.8 Hydrology

The peak rate runoff flow of the proposed site increases due to increase in impervious areas including roof, drive aisles, and parking spaces. However, runoff is mitigated by implementation of hydromodification using above ground detention basin as a permanent BMP. The existing and proposed flows were calculated using the Rational Method based on the site conditions discussed in Sections 2.1 and 2.2, respectively.

3.8.1 Existing Hydrology

The entire existing site sheet flows in a generally southwesterly direction towards the existing catch basin located at the southwest side of the property. The catch basin ties into the existing 24” RCP pipe that ties into the existing curb inlet catch basin located in Mystra Drive. The existing flow for the different storm frequencies is outlined in Table 2 below.

Table 2 – Summary of Existing Flow

Storm Event	Q (cfs)
2-yr	2.16
10-yr	3.08
50-yr	3.85
100-yr	4.62

3.8.2 Proposed Hydrology

The proposed project site has been subdivided into subareas for runoff of storm water based on drainage patterns including ridge lines and low/confluence points. The drainage patterns include the roof surface runoff and ground surface runoff areas. Each subarea and the discharge point of each subarea is identified in the Proposed Hydrology Map. Flow for each subarea prior to hydromodification is outlined in Table 3 below:

Table 3 – Summary of Proposed Flows Prior to Hydromodification

Subarea	Q (cfs)				Area	
	2-year	10-year	50-year	100-year	(sf)	(ac)
Area 1	1.61	2.30	2.87	3.43	32,231	0.74
Area 2	1.18	1.68	2.10	2.53	11,685	0.27
Area 3	0.65	0.92	1.16	1.39	5,823	0.13
Area 4	1.10	1.57	1.97	2.36	9,508	0.22
Area 5	2.56	3.66	4.57	5.49	20,271	0.47
Area 6	1.13	1.61	2.01	2.41	15,482	0.36
Area 7	0.36	0.51	0.64	0.76	18,359	0.42
Area 8	0.07	0.10	0.12	0.14	8,388	0.19
Area 9	0.04	0.06	0.07	0.08	4,546	0.10
Area 10	0.07	0.09	0.12	0.14	1,255	0.03
Total	**8.75**	**12.50**	**15.63**	**18.75**	**127,548**	**2.93**

However, hydromodification is applied by use of the detention basin with overflow riser and weirs in order to mitigate the increase in flow. Therefore, post-development Q $\leq$ pre-development Q. Hydromodification analysis was performed as part of the Storm Water Quality Mitigation Plan.

The proposed site drains onto the biofiltration basin. Table 4 below summarizes tributary areas onto the basins.

4.0 Hydraulics

Hydraulics analysis was performed using Manning's equation for each subarea contributing flow to the proposed underground storm drain system. The proposed storm drain system has been designed to handle capacity for 100-year peak flow rates. Please see Appendix B for hydraulics calculations for the proposed storm drain system.

The underground tank system was designed by performing continuous simulation hydrologic modeling or an approved regression equation using San Diego Hydrology Model (SDHM) 3.1 software. The modeling was performed as part of the SWQMP report submittal. Simulation was performed for flow rates ranging from 10 percent of the predevelopment 2-year runoff event (0.1Q2) to the pre-development 10-year runoff event (Q10). This translates to flow rates of 0.251 CFS to 3.58 CFS. The basin was sized so the post-project discharge rates and durations do not exceed the pre-development rates and durations by more than 10 percent. See Appendix E for the modeling results.

The energy grade line of the storm drain pipe system is lower than the finish surface grades.

The downstream storm drain pipe is sized to have an outfall flow rate leaving the site to not exceed the proposed 100-yr flow.

5.0 Conclusion

The overall drainage patterns in the proposed condition are similar to the existing condition. However, the proposed drainage patterns are divided into multiple subareas as shown on the attached Hydrology Map – Proposed Condition. The subareas account for the ridges in the roof areas as well as the ground surfaces including the drive aisles, parking spaces, and landscape areas.

The proposed storm drain system has been designed for the 100-yr storm event. Because of the new development, there is an increase in the impervious areas and decrease in the pervious areas thus increasing the storm water runoff flow. However, as part of the SWQMP requirements, the proposed storm drain runoff flow is mitigated by implementing hydromodification requirements. Due to hydromodification Q post-development $\leq$ Q existing. Detailed hydromodification calculations are included in the approved SWQMP report, and are also included in Appendix E of this report for reference.

As part of the storm drain system one biofiltration facility and one detention tank system are required to be constructed to collect all storm drain water and treat and mitigate the required volumes and flows before leaving the site per the current Storm Water Quality Mitigation Plan, Regional Water Quality Control Board, and MS4 Permit requirements. The proposed storm drain system will tie-in to the existing curb inlet catch basin located in Mystra Drive.

The detention has been designed detain volume of storm water to mitigate runoff between $0.1Q_2$ to Q_{10}. The detention tanks are 3 feet deep concrete vaults and includes a riser 2 feet above the bottom of the vaults. The overflow pipe downstream of the riser has been sized to handle a 100-year storm event.

Appendix A – Hydrology Calculations

Existing Hydrology Calculations

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Existing Area 1

A_T = 127,547 sf = 2.93 ac
A_P = 117,192 sf = 2.69 ac
A_I = 10,355 sf = 0.24 ac

% Impervious = 0.08

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as undisturbed natural terrain)

C_p = 0.4

C = 0.44

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.44
D = 350 ft
s = 2.2 %

T = 17.07 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.67 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.39 in/hr

Selected frequency = 50 years

P_6	=	2.5	in	per Appendix B
P_{24}	=	4.5	in	per Appendix B
P_6/P_{24}	=	55.56	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.98 in/hr

Selected frequency = 100 years

P_6	=	3.0	in	per Appendix B
P_{24}	=	5.0	in	per Appendix B
P_6/P_{24}	=	60.00	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.58 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 127,547 sf = 2.928 acres

Q_2 = 2.16 cfs
Q_{10} = 3.08 cfs
Q_{50} = 3.85 cfs
Q_{100} = 4.62 cfs

Proposed Hydrology Calculations

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 1

A_T = 32,231 sf
A_P = 4,251 sf
A_I = 27,980 sf

% Impervious = 0.87

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as general commercial)

C_p = 0.83

C = 0.89

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2))]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.89
D = 400 ft
s = 0.5 %

T = 9.49 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years

P_6 = 1.4 in per Appendix B

P_{24} = 2.2 in per Appendix B

P_6/P_{24} = 63.64 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.44 in/hr

Selected frequency = 10 years

P_6 = 2.0 in per Appendix B

P_{24} = 3.5 in per Appendix B

P_6/P_{24} = 57.14 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.49 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 4.36 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 5.23 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 32,231 sf = 0.74 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 1.61 cfs

Q_{10} = 2.30 cfs

Q_{50} = 2.87 cfs

Q_{100} = 3.45 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 2

A_T = 11,685 sf
A_P = 1,848 sf
A_I = 9,837 sf

% Impervious = 84%

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as general commercial)

C_p = 0.81

C = 0.89

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.89
D = 84 ft
s = 1.4 %

T = 3.16 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 4.96 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 7.09 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 8.86 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 10.63 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 11,685 sf = 0.268 acres

Q_2 = 1.18 cfs

Q_{10} = 1.68 cfs

Q_{50} = 2.10 cfs

Q_{100} = 2.53 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 3

A_T = 5,823 sf
A_P = 819 sf
A_I = 5,004 sf

% Impervious = 86%

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as general commercial)

C_p = 0.83

C = 0.89

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.89
D = 75 ft
s = 1.7 %

T = 2.74 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44*P_6*T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 5.44 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 7.77 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 9.71 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 11.65 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 5,823 sf = 0.134 acres

Q_2 = 0.65 cfs

Q_{10} = 0.92 cfs

Q_{50} = 1.16 cfs

Q_{100} = 1.39 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 4

A_T = 9,508 sf
A_P = 1,282 sf
A_I = 8,226 sf

% Impervious = 87%

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

$C = 0.90 \times (\%\ Impervious) + C_p \times (1 - \%\ Impervious)$

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as general commercial)

C_p = 0.83

C = 0.89

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.89
D = 76 ft
s = 2.1 %

T = 2.57 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 5.67 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 8.10 in/hr

Selected frequency = 50 years

P_6 =	2.5	in	per Appendix B	
P_{24} =	4.5	in	per Appendix B	
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 10.13 in/hr

Selected frequency = 100 years

P_6 =	3.0	in	per Appendix B
P_{24} =	5.0	in	per Appendix B
P_6/P_{24} =	60.00	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 12.15 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 9,508 sf = 0.218 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 1.10 cfs

Q_{10} = 1.57 cfs

Q_{50} = 1.97 cfs

Q_{100} = 2.36 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 5

A_T = 20,271 sf
A_P = 6,096 sf
A_I = 14,175 sf

% Impervious = 70%

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as general commercial)

C_p = 0.74

C = 0.85

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.85
D = 35 ft
s = 2 %

T = 2.10 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 6.46 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 9.23 in/hr

Selected frequency = 50 years

P_6 =	2.5	in		per Appendix B
P_{24} =	4.5	in		per Appendix B
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 11.54 in/hr

Selected frequency = 100 years

P_6 =	3.0	in	per Appendix B
P_{24} =	5.0	in	per Appendix B
P_6/P_{24} =	60.00	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 13.84 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 20,271 sf = 0.465 acres

Q_2 = 2.56 cfs

Q_{10} = 3.66 cfs

Q_{50} = 4.57 cfs

Q_{100} = 5.49 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 6

A_T = 15,482 sf
A_P = 2,221 sf
A_I = 13,261 sf

% Impervious = 86%

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as general commercial)

C_p = 0.83

C = 0.89

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.89
D = 286 ft
s = 1.77 %

T = 5.29 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 3.56 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 5.08 in/hr

Selected frequency = 50 years

P_6 =	2.5	in	per Appendix B	
P_{24} =	4.5	in	per Appendix B	
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 6.35 in/hr

Selected frequency = 100 years

P_6 =	3.0	in	per Appendix B	
P_{24} =	5.0	in	per Appendix B	
P_6/P_{24} =	60.00	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 7.63 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 15,482 sf = 0.355 acres

Q_2 = 1.13 cfs

Q_{10} = 1.61 cfs

Q_{50} = 2.01 cfs

Q_{100} = 2.41 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 7

A_T = 18,359 sf
A_P = 16,674 sf
A_I = 1,685 sf

% Impervious = 9%

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as general commercial)

C_p = 0.40

C = 0.45

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.45
D = 190 ft
s = 1.54 %

T = 14.05 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.89 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.71 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 3.38 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 4.06 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 18,359 sf = 0.421 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 0.36 cfs

Q_{10} = 0.51 cfs

Q_{50} = 0.64 cfs

Q_{100} = 0.76 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 8

A_T = 8,388 sf
A_P = 8,388 sf
A_I = 0 sf

% Impervious = 0%

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as general commercial)

C_p = 0.35

C = 0.35

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.35
D = 110 ft
s = 0.05 %

T = 38.43 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 0.99 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.41 in/hr

Selected frequency = 50 years

P_6 =	2.5	in	per Appendix B	
P_{24} =	4.5	in	per Appendix B	
P_6/P_{24} =	55.56	%		

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 1.77 in/hr

Selected frequency = 100 years

P_6 =	3.0	in	per Appendix B
P_{24} =	5.0	in	per Appendix B
P_6/P_{24} =	60.00	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.12 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 8,388 sf = 0.193 acres

Q_2 = 0.07 cfs

Q_{10} = 0.10 cfs

Q_{50} = 0.12 cfs

Q_{100} = 0.14 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 9

A_T = 4,546 sf
A_P = 4,546 sf
A_I = 0 sf

% Impervious = 0%

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as general commercial)

C_p = 0.35

C = 0.35

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where
T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.35
D = 94 ft
s = 0.059 %

T = 33.62 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44*P_6*T^{-0.645}$

Where
I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.08 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 1.54 in/hr

Selected frequency = 50 years

P_6	=	2.5	in	per Appendix B
P_{24}	=	4.5	in	per Appendix B
P_6/P_{24}	=	55.56	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 1.93 in/hr

Selected frequency = 100 years

P_6	=	3.0	in	per Appendix B
P_{24}	=	5.0	in	per Appendix B
P_6/P_{24}	=	60.00	%	

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 2.31 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

A = 4,546 sf = 0.104 acres

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

Q_2 = 0.04 cfs

Q_{10} = 0.06 cfs

Q_{50} = 0.07 cfs

Q_{100} = 0.08 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Area 10

A_T = 1,255 sf
A_P = 0 sf
A_I = 1,255 sf

% Impervious = 100%

Soil Type = D (Soil Type D, Soil type determined from Web Soil Survey prepared by USDA)

C = 0.90 x (% Impervious) + C_p x (1 - % Impervious)

Where C_p = pervious coefficient runoff value for the soil type (shown in Table 3-1 as general commercial)

C_p = 0.90

C = 0.90

Calculate the duration (T) per Figure 3.3.

T = [1.8*(1.1-C)*(D^(1/2)]/[s^(1/3)]

Where T = duration/ overland flow time, min
C = runoff coefficient
D = watercourse distance, ft
s = slope, %

C = 0.90
D = 94 ft
s = 0.059 %

T = 8.97 min

Calculate intensity (I) per Figure 3.2.

$I = 7.44 * P_6 * T^{-0.645}$

Where I = intensity, in/hr
P_6 = 6-hour precipitation, in
P_{24} = 24-hour precipitation, in
T = duration, min

Selected frequency = 2 years
P_6 = 1.4 in per Appendix B
P_{24} = 2.2 in per Appendix B
P_6/P_{24} = 63.64 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 2.53 in/hr

Selected frequency = 10 years
P_6 = 2.0 in per Appendix B
P_{24} = 3.5 in per Appendix B
P_6/P_{24} = 57.14 %
(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)
I = 3.62 in/hr

Selected frequency = 50 years

P_6 = 2.5 in per Appendix B

P_{24} = 4.5 in per Appendix B

P_6/P_{24} = 55.56 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 4.52 in/hr

Selected frequency = 100 years

P_6 = 3.0 in per Appendix B

P_{24} = 5.0 in per Appendix B

P_6/P_{24} = 60.00 %

(6 hr precipitation is within the range of 45% to 65% of the 24 hr precipitation so adjustment is uneccessary)

I = 5.42 in/hr

Calculate peak rate of runoff (Q).

Q = C*I*A

Where
Q = peak rate of runoff, cfs
C = runoff coefficient
I = intensity, in/hr
A = drainage area contributing to the design location, acres

A = 1,255 sf = 0.029 acres

Q_2 = 0.07 cfs

Q_{10} = 0.09 cfs

Q_{50} = 0.12 cfs

Q_{100} = 0.14 cfs

HYDROLOGY CALCULATIONS
4500 CANNON ROAD

Subarea	Q (cfs)				Area	
	2-year	10-year	50-year	100-year	(sf)	(ac)
Area 1	1.61	2.30	2.87	3.45	32,231	0.74
Area 2	1.18	1.68	2.10	2.53	11,685	0.27
Area 3	0.65	0.92	1.16	1.39	5,823	0.13
Area 4	1.10	1.57	1.97	2.36	9,508	0.22
Area 5	2.56	3.66	4.57	5.49	20,271	0.47
Area 6	1.13	1.61	2.01	2.41	15,482	0.36
Area 7	0.36	0.51	0.64	0.76	18,359	0.42
Area 8	0.07	0.10	0.12	0.14	8,388	0.19
Area 9	0.04	0.06	0.07	0.08	4,546	0.10
Area 10	0.07	0.09	0.12	0.14	1,255	0.03
Total	**8.75**	**12.50**	**15.63**	**18.75**	**127,548**	**2.93**

Appendix B – Hydraulics Calculations

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

LINE A

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.25 ft
r = 0.63 ft

R = A/P
A = 1.23 ft^2
P = 3.93 ft
R = 0.31 ft

S = 0.50% = 0.005 ft/ft
n = 0.010

Q_{pipe} = 5.95 cfs

For Areas 1 Q_{100} = 3.45 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

LINE B

$Q_{pipe} = (1.49/n)*A*R^{2/3}*S^{1/2}$

Where Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.25 ft
r = 0.63 ft

R = A/P
A = 1.23 ft^2
P = 3.93 ft
R = 0.31 ft

S = 0.50% = 0.005 ft/ft
n = 0.010

Q_{pipe} = 5.95 cfs

For Area 1, 2 Q_{100} = 5.97 cfs

$Q_{pipe} > Q_{100}$ Therefore, OK.

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

LINE C

Q_{pipe} =	$(1.49/n)*A*R^{2/3}*S^{1/2}$		Where	Q_{pipe} = existing peak flows, cfs	
				n = Manning's roughness coefficient	
d =	1.50	ft		0.010 for	PVC
r =	0.75	ft		A = sectional area, ft^2	
				R = wetted radius, ft	
R =	A/P			S = slope, ft/ft	
A =	1.77	ft^2			
P =	4.71	ft		P = cross-section perimeter of existing pipe, ft	
R =	0.38	ft		d = cross-section diameter of existing pipe, ft	
				r = cross-section radius of existing pipe, ft	

S = 0.50% = 0.005 ft/ft
n = 0.010

Q_{pipe} = 9.68 cfs

For Area 1, 2, 3 Q_{100} = 7.36 cfs

Q_{pipe} > Q_{100} Therefore, OK.

V = Q/A
V = 5.48 ft/sec

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

LINE D

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$		Where	Q_{pipe} = existing peak flows, cfs	
			n = Manning's roughness coefficient	
d =	0.67 ft		0.010 for	PVC
r =	0.33 ft		A = sectional area, ft^2	
			R = wetted radius, ft	
R = A/P			S = slope, ft/ft	
A =	0.35 ft^2			
P =	2.09 ft		P = cross-section perimeter of existing pipe, ft	
R =	0.17 ft		d = cross-section diameter of existing pipe, ft	
			r = cross-section radius of existing pipe, ft	

S = 2.30% = 0.023 ft/ft

n = 0.010

Q_{pipe} = 2.39 cfs

For Area 4 Q_{100} = 2.36 cfs

$Q_{pipe} > Q_{100}$ Therefore, OK.

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

LINE E

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.50 ft
r = 0.75 ft

R = A/P
A = 1.77 ft^2
P = 4.71 ft
R = 0.38 ft

S = 0.50% = 0.005 ft/ft
n = 0.010

Q_{pipe} = 9.68 cfs

For Area 1, 2, 3, 4 Q_{100} = 9.72 cfs

Q_{pipe} > Q_{100} Therefore, OK.

V = Q/A
V = 5.48 ft/sec

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

LINE F

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.25 ft
r = 0.13 ft

R = A/P
A = 0.05 ft^2
P = 0.79 ft
R = 0.06 ft

S = 0.50% = 0.005 ft/ft
n = 0.010

Q_{pipe} = 0.08 cfs

For Area 9 Q_{100} = 0.08 cfs

Q_{pipe} > Q_{100} Therefore, OK.

2

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

LINE G

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.00 ft
r = 0.50 ft

R = A/P
A = 0.79 ft^2
P = 3.14 ft
R = 0.25 ft

S = 1.40% = 0.014 ft/ft
n = 0.010

Q_{pipe} = 5.49 cfs

For Area 5 Q_{100} = 5.49 cfs

Q_{pipe} > Q_{100} Therefore, OK.

7

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

LINE H

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$		Where	Q_{pipe} = existing peak flows, cfs
			n = Manning's roughness coefficient
d =	1.25 ft		0.010 for PVC
r =	0.63 ft		A = sectional area, ft^2
			R = wetted radius, ft
R = A/P			S = slope, ft/ft
A =	1.23 ft^2		
P =	3.93 ft		P = cross-section perimeter of existing pipe, ft
R =	0.31 ft		d = cross-section diameter of existing pipe, ft
			r = cross-section radius of existing pipe, ft

S = 4.80% = 0.048 ft/ft
n = 0.010

Q_{pipe} = 18.45 cfs

For Area 5 Q_{100} = 18.67 cfs

Q_{pipe} > Q_{100} Therefore, OK.

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

RISER

$Q_{pipe} = (1.49/n)*A*R^{2/3}*S^{1/2}$

Where Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 0.83 ft
r = 0.42 ft

R = A/P
A = 0.54 ft^2
P = 2.61 ft
R = 0.21 ft

S = 100.00% = 1.000 ft/ft
n = 0.010

Q_{pipe} = 28.26 cfs

For Riser Q_{100} = 18.75 cfs

$Q_{pipe} > Q_{100}$ Therefore, OK.

HYDRAULICS CALCULATIONS
4500 CANNON ROAD

BIOFILTRATION

Q_{pipe} = $(1.49/n)*A*R^{2/3}*S^{1/2}$

Where
Q_{pipe} = existing peak flows, cfs
n = Manning's roughness coefficient
0.010 for PVC
A = sectional area, ft^2
R = wetted radius, ft
S = slope, ft/ft

P = cross-section perimeter of existing pipe, ft
d = cross-section diameter of existing pipe, ft
r = cross-section radius of existing pipe, ft

d = 1.00 ft
r = 0.50 ft

R = A/P
A = 0.79 ft^2
P = 3.14 ft
R = 0.25 ft

S = 0.65% = 0.007 ft/ft
n = 0.010

Q_{pipe} = 3.74 cfs

For all Areas Q_{100} = 18.75 cfs

Q_{pipe} > Q_{100} Therefore, OK.

d = 1.00 ft
r = 0.50 ft

R = A/P
A = 0.79 ft^2
P = 3.14 ft
R = 0.25 ft

S = 1.00% = 0.010 ft/ft
n = 0.010

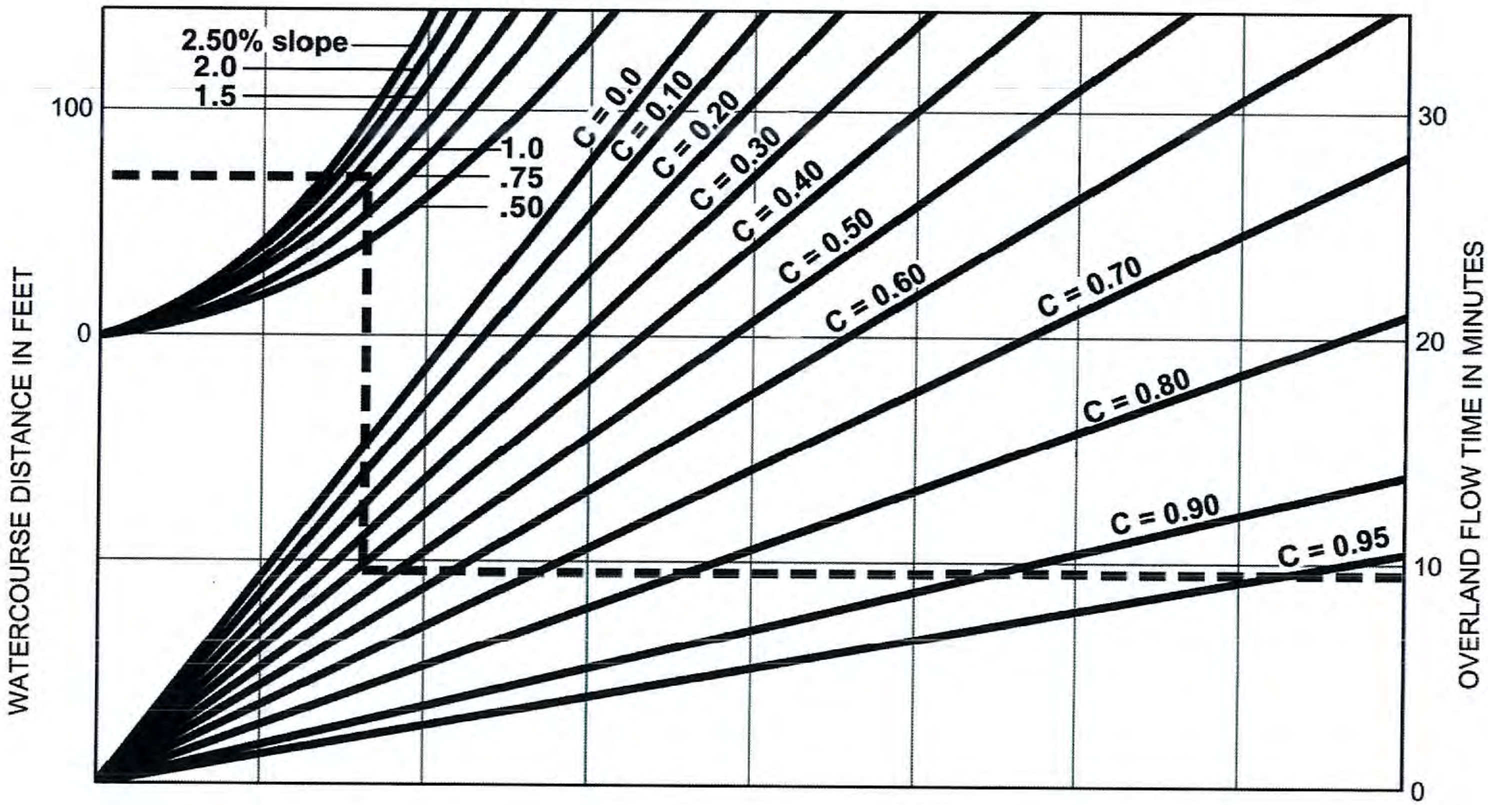
Q_{pipe} = 4.64 cfs Q_{100} = 3.75 cfs

Appendix C – Reference Figures and Tables

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service



EXAMPLE:

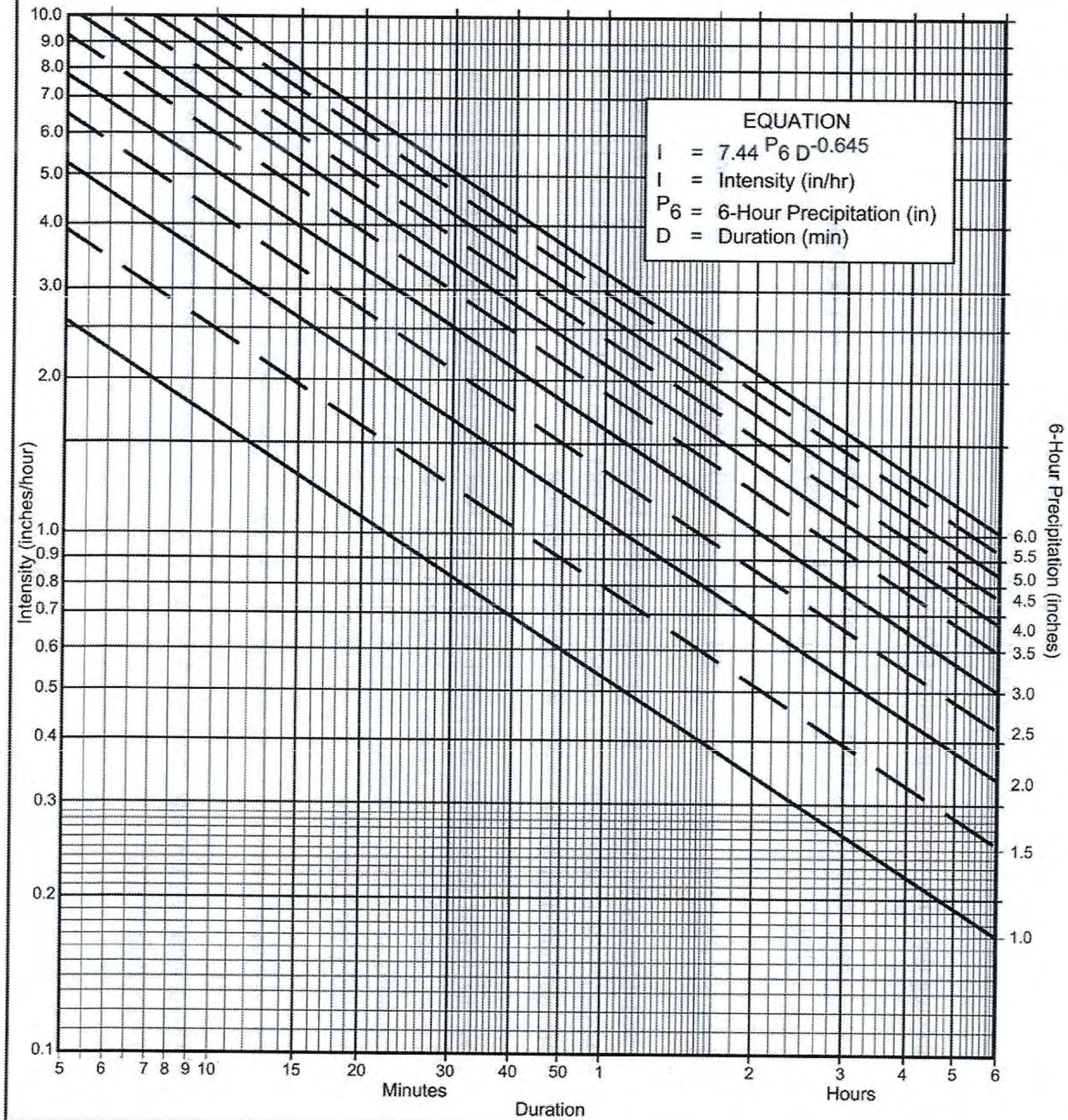
Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE 3-3

Rational Formula - Overland Time of Flow Nomograph



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency ______ year

(b) P_6 = ______ in., P_{24} = ______, $\frac{P_6}{P_{24}}$ = ______ %(2)

(c) Adjusted $P_6^{(2)}$ = ______ in.

(d) t_x = ______ min.

(e) I = ______ in./hr.

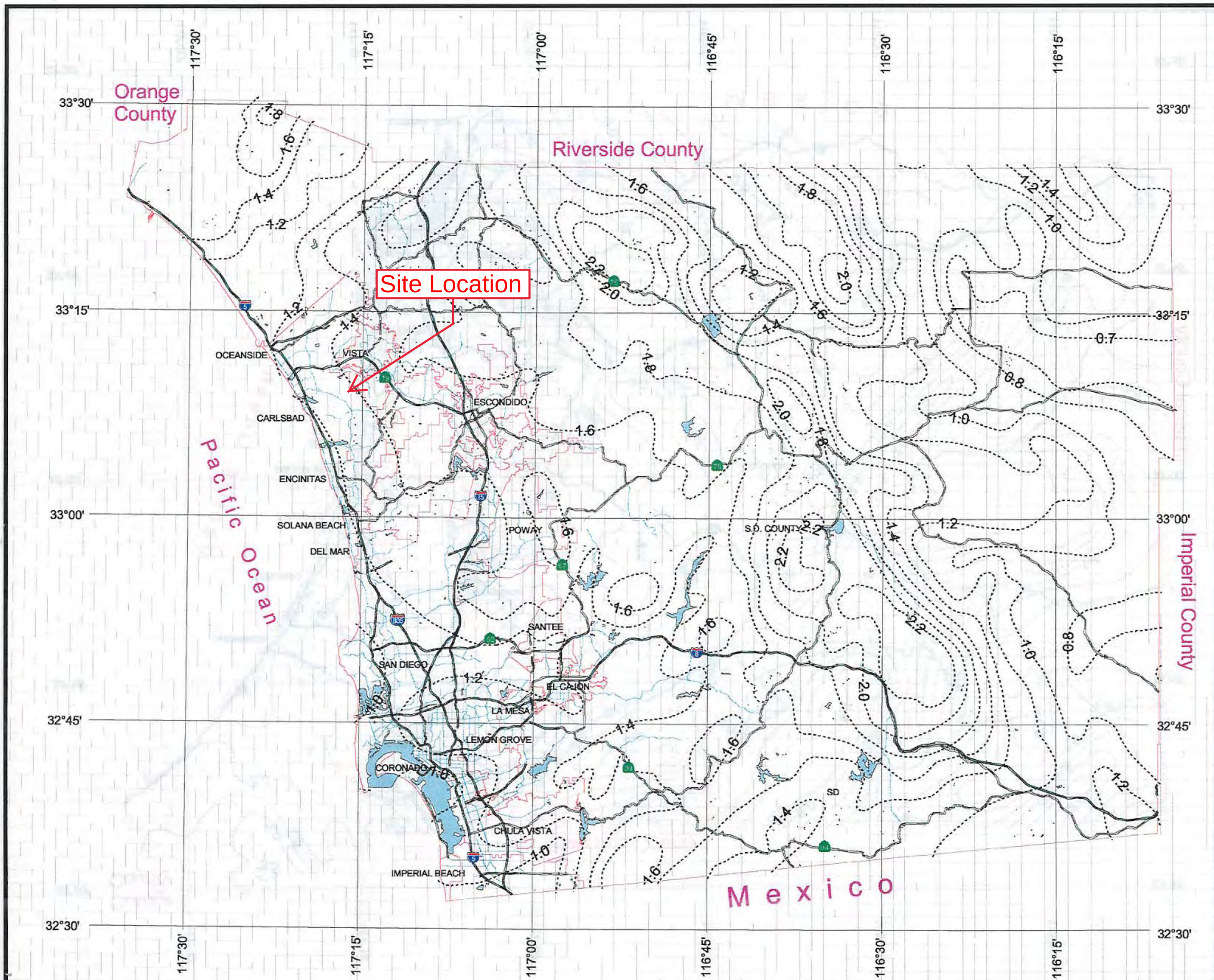
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE

3-1



County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 6 Hours

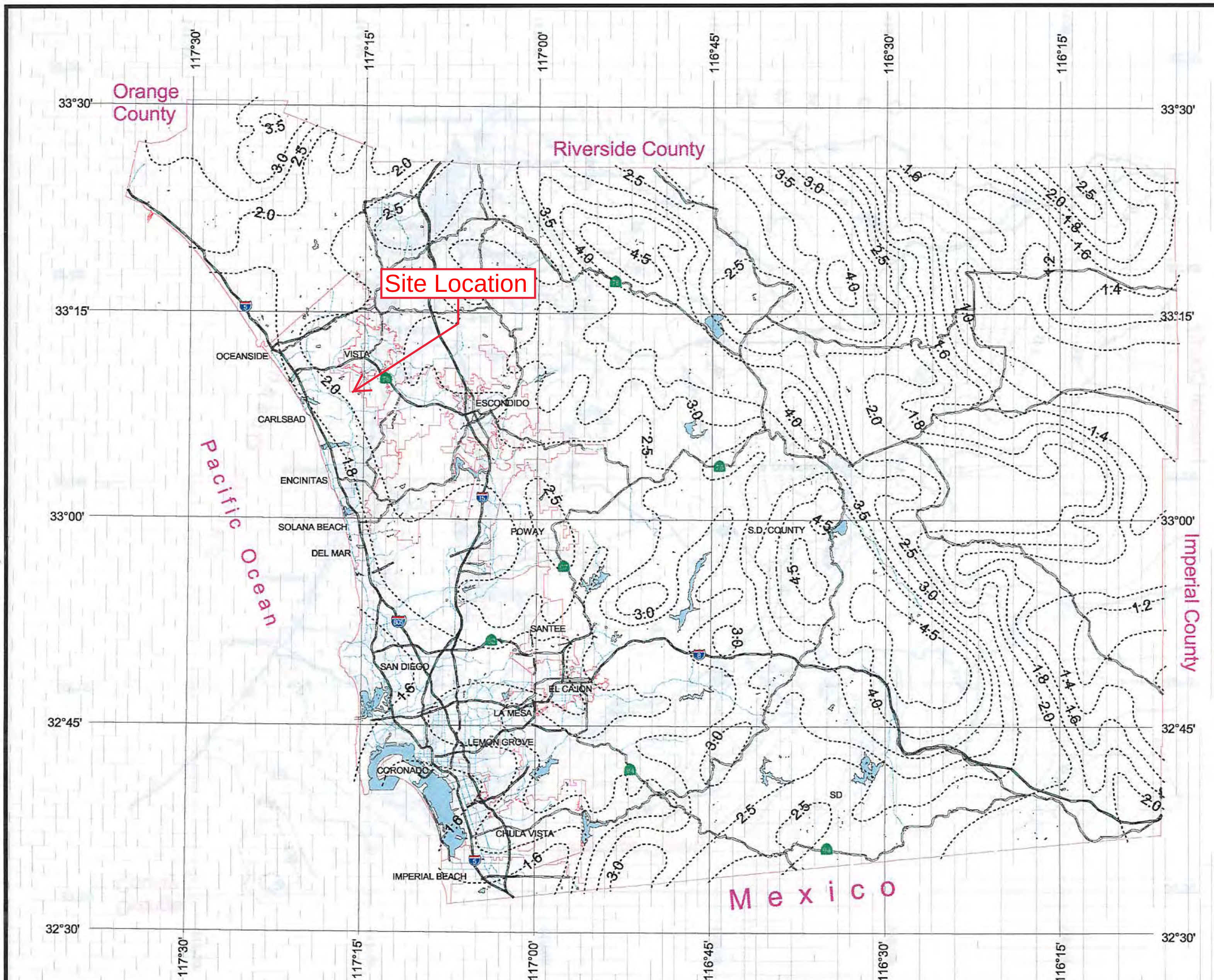
------- Isopluvial (inches)

DPW GIS

SanGIS We Have San Diego Covered!

N E S W

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

2 Year Rainfall Event - 24 Hours

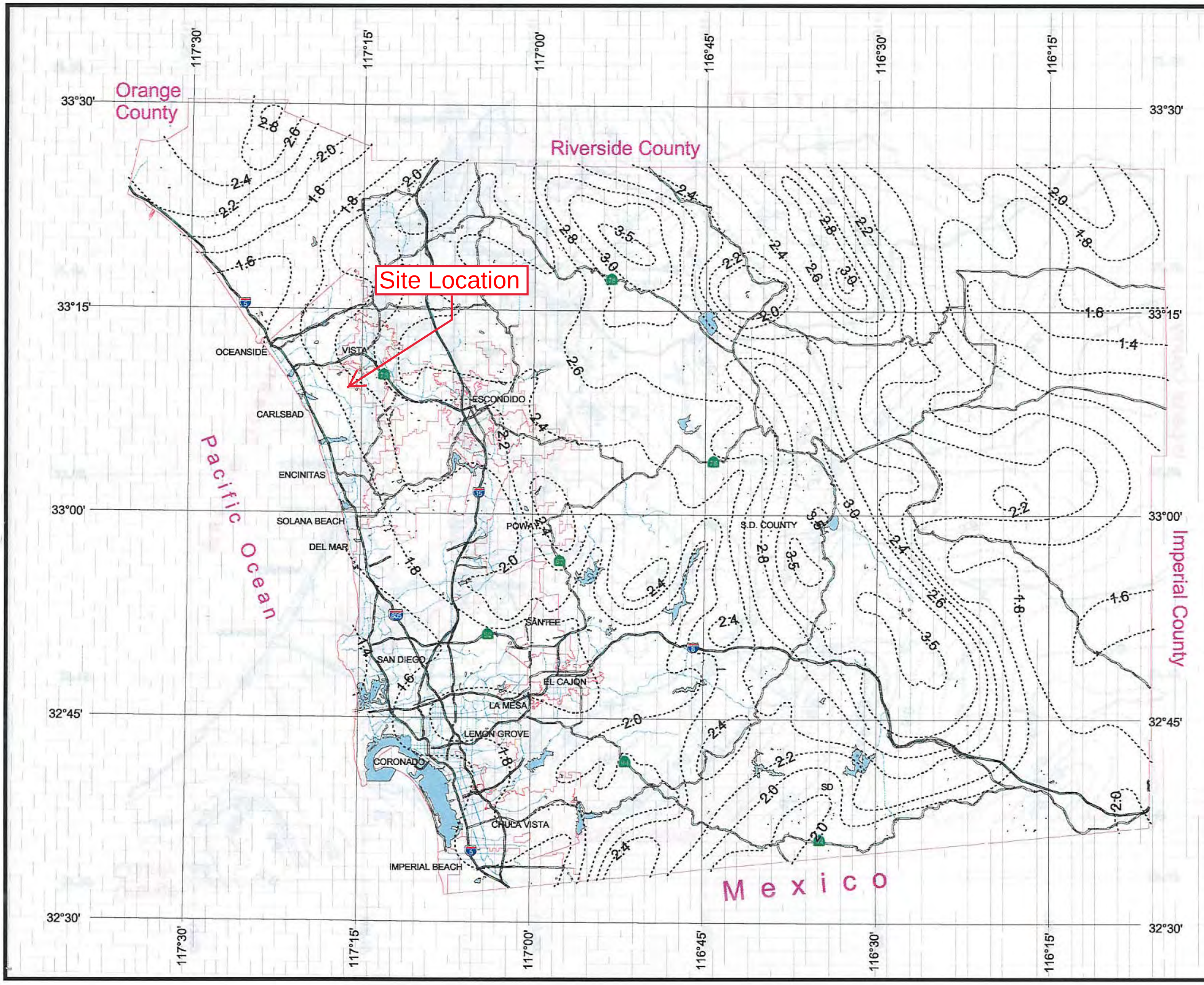
------- Isopluvial (inches)

DPW GIS

SanGIS
We Have San Diego Covered!

N S E W

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 6 Hours

-------- Isopluvial (inches)

DPW GIS

SanGIS We Have San Diego Covered!

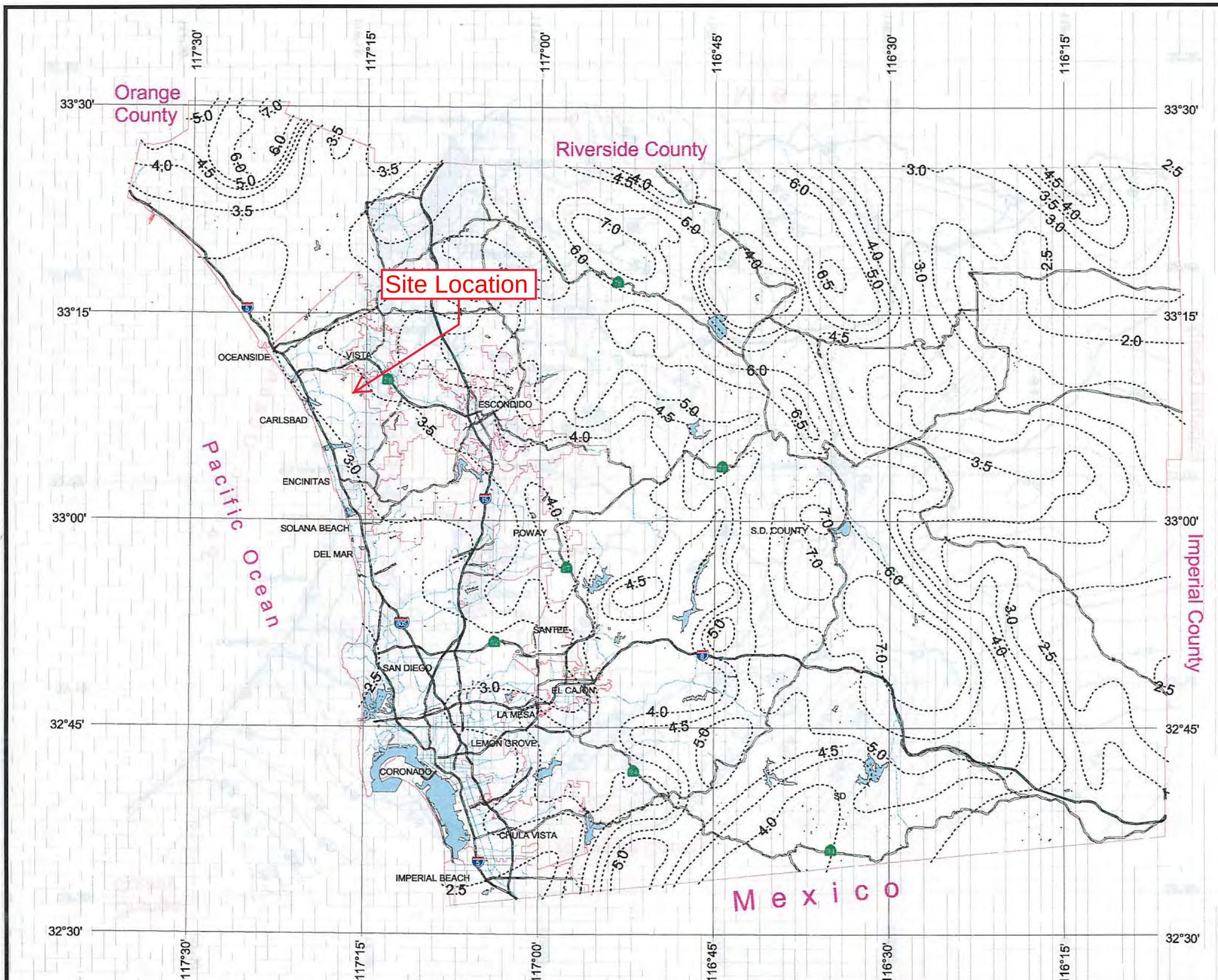
THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

N W E S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

10 Year Rainfall Event - 24 Hours

------- Isopluvial (inches)

DPW GIS

SanGIS We Have San Diego Covered!

N E S W

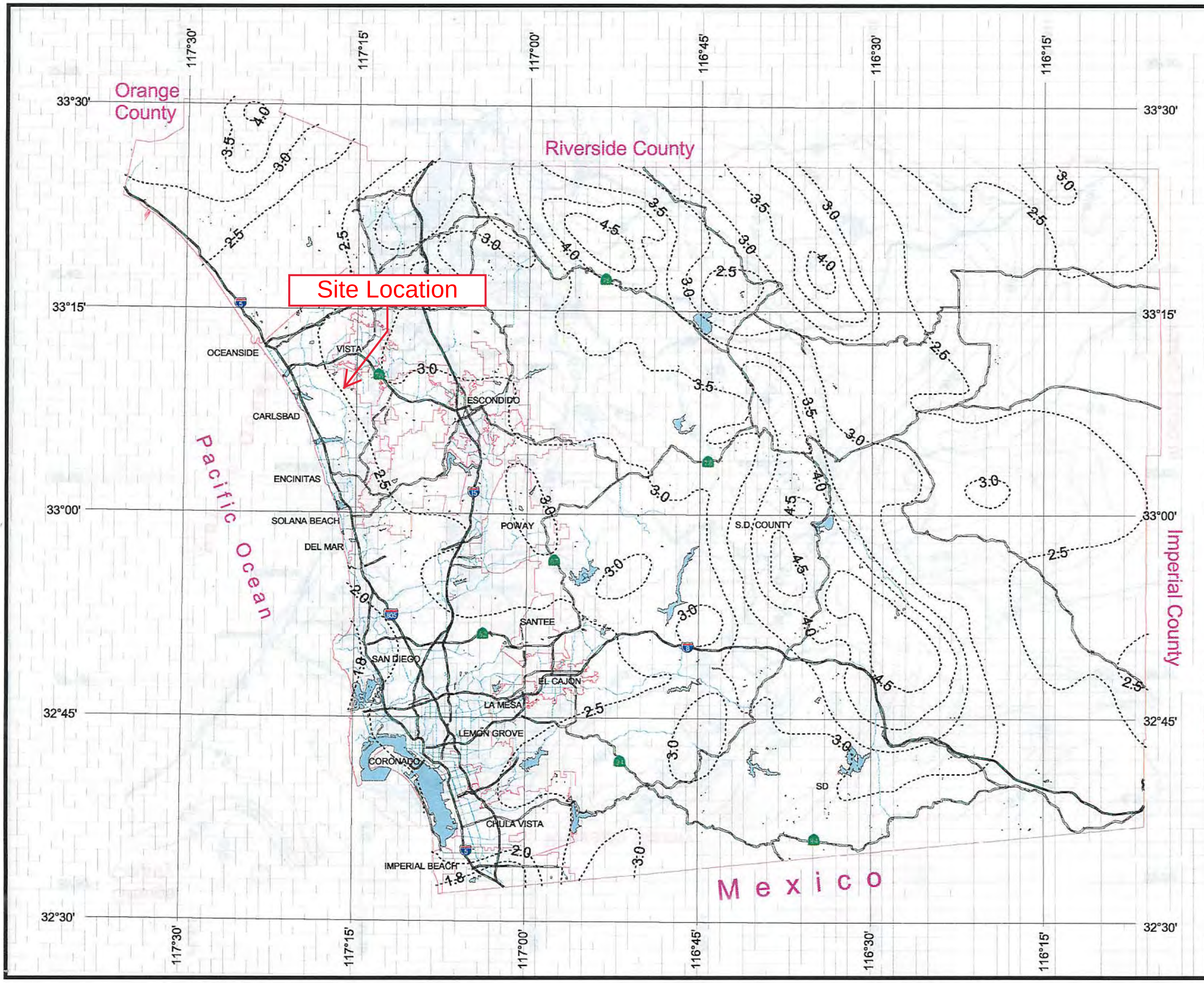
3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 6 Hours

-------- Isopluvial (inches)



DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

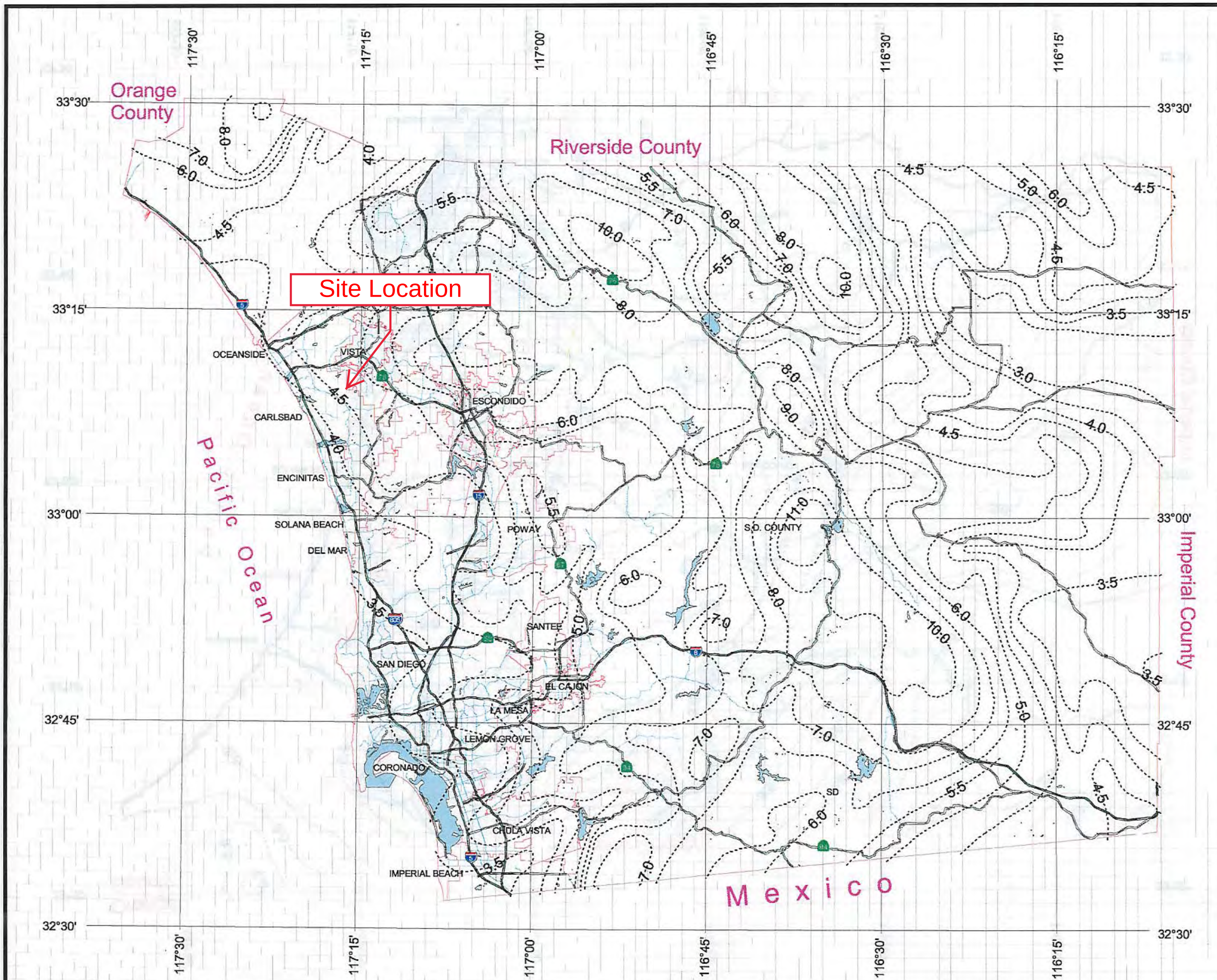
N
W E
S

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

------- Isopluvial (inches)

DPW GIS

SanGIS
We Have San Diego Covered!

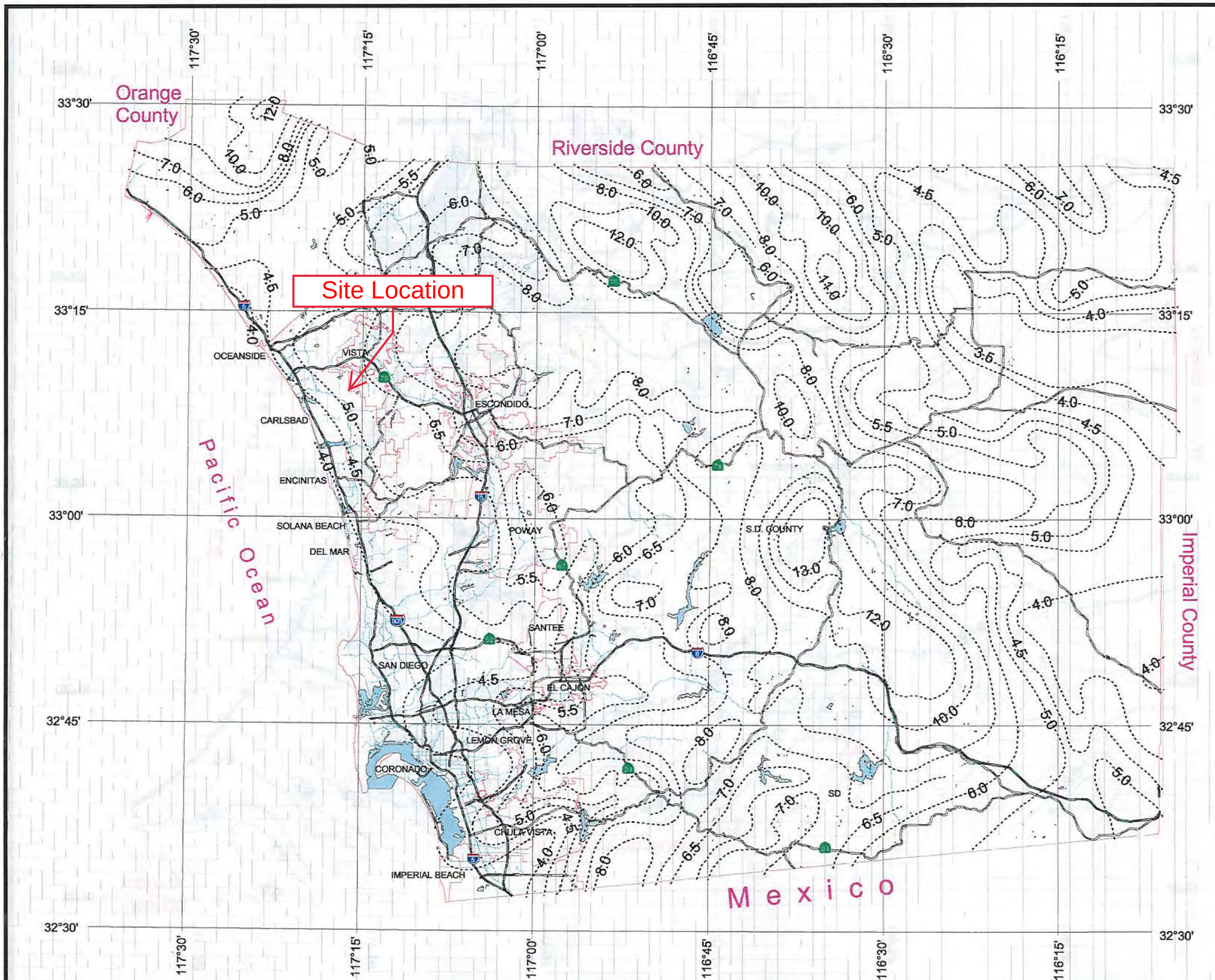
THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

N E S W

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS

SanGIS We Have San Diego Covered!

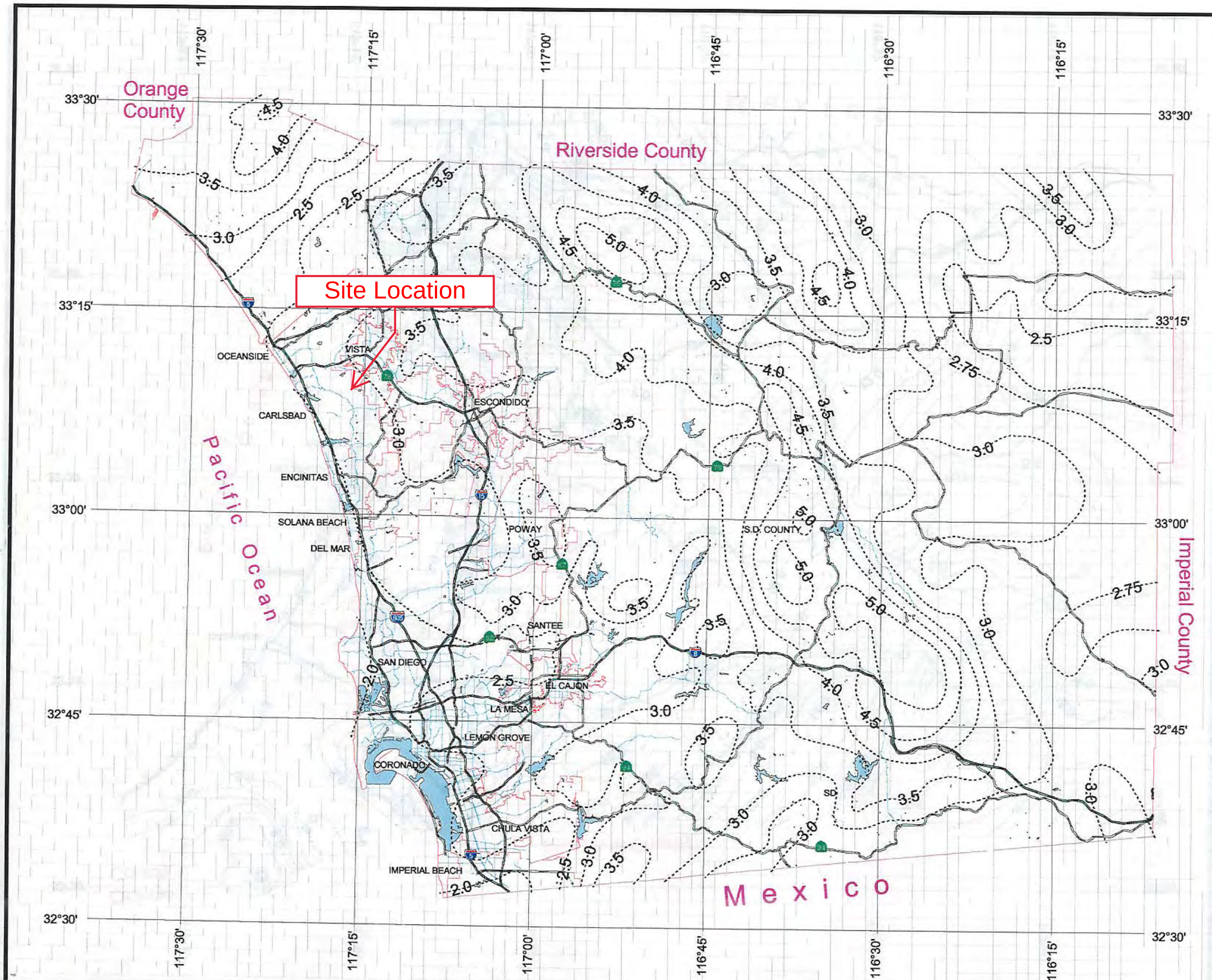
N S E W

3 0 3 Miles

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

------- Isopluvial (inches)

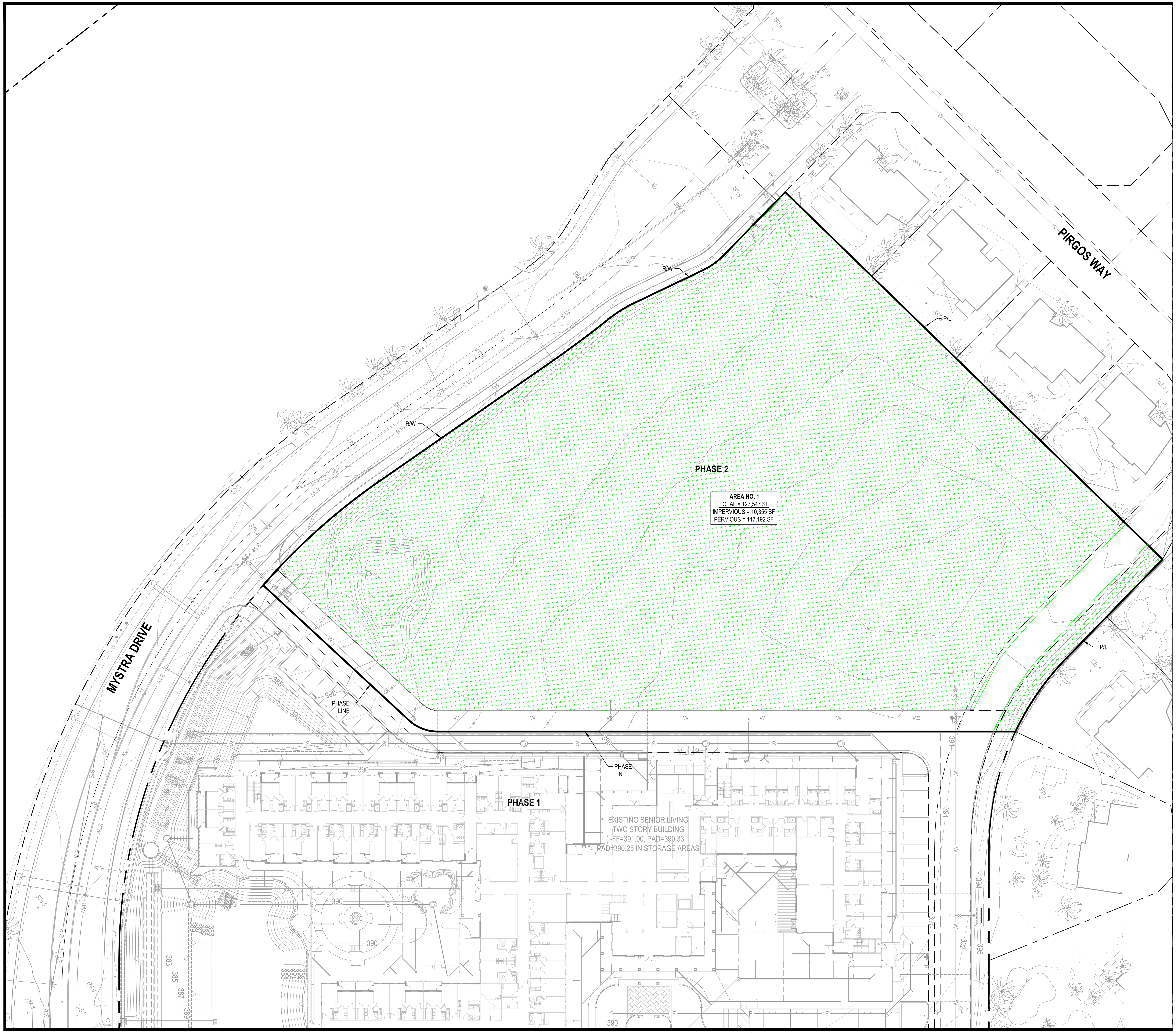
DPW GIS

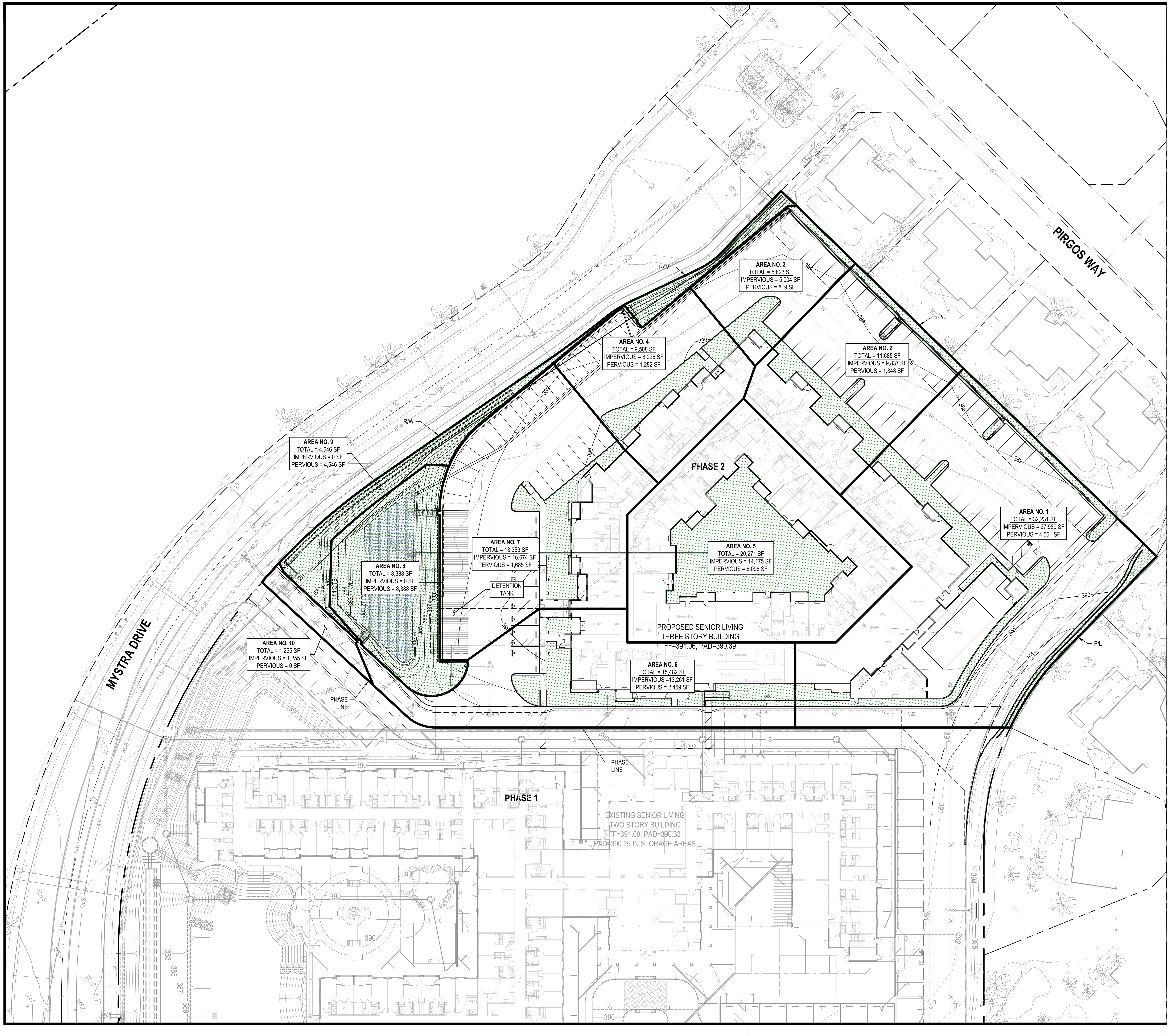
SanGIS We Have San Diego Covered!

N S E W

3 0 3 Miles

Appendix D –Hydrology Maps


PIRGOS WAY
MYSTRA DRIVE
R/W
P/L
PHASE 2
AREA NO. 1
TOTAL = 127,547 SF
IMPERVIOUS = 10,355 SF
PERVIOUS = 117,192 SF
PHASE LINE
PHASE LINE
PHASE 1
EXISTING SENIOR LIVING
TWO STORY BUILDING
FF=391.00, PAD=390.33
PAD=390.25 IN STORAGE AREAS


PIRGOS WAY
MYSTRA DRIVE
AREA NO. 1
TOTAL = 32,231 SF
IMPERVIOUS = 27,980 SF
PERVIOUS = 4,551 SF
AREA NO. 2
TOTAL = 11,685 SF
IMPERVIOUS = 9,837 SF
PERVIOUS = 1,848 SF
AREA NO. 3
TOTAL = 5,823 SF
IMPERVIOUS = 5,004 SF
PERVIOUS = 819 SF
AREA NO. 4
TOTAL = 9,508 SF
IMPERVIOUS = 8,226 SF
PERVIOUS = 1,282 SF
AREA NO. 5
TOTAL = 20,271 SF
IMPERVIOUS = 14,175 SF
PERVIOUS = 6,096 SF
AREA NO. 6
TOTAL = 15,482 SF
IMPERVIOUS =13,261 SF
PERVIOUS = 2,459 SF
AREA NO. 7
TOTAL = 18,359 SF
IMPERVIOUS = 16,674 SF
PERVIOUS = 1,685 SF
AREA NO. 8
TOTAL = 8,388 SF
IMPERVIOUS = 0 SF
PERVIOUS = 8,388 SF
AREA NO. 9
TOTAL = 4,546 SF
IMPERVIOUS = 0 SF
PERVIOUS = 4,546 SF
AREA NO. 10
TOTAL = 1,255 SF
IMPERVIOUS = 1,255 SF
PERVIOUS = 0 SF
DETENTION TANK
PHASE 2
PROPOSED SENIOR LIVING
THREE STORY BUILDING
FF=391.06, PAD=390.39
PHASE LINE
PHASE LINE
PHASE 1
EXISTING SENIOR LIVING
TWO STORY BUILDING
FF=391.00, PAD=390.33
PAD=390.25 IN STORAGE AREAS
R/W
R/W
P/L
P/L

ATTACHMENT 6
Geotechnical and Groundwater Investigation Report

This is the cover sheet for Attachment 6.

Placeholder – **Geotechnical and Groundwater Investigation Report**

Replace placeholder with geotechnical and groundwater investigation report.

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.

GEOTECHNICAL EVALUATION

Protea Senior Living Oceanside, LLC
Proposed "Ocean Hills Phase 2" Senior Facility Development
4500 Cannon Road
Assessor's Parcel Number (APN): 169-562-01
City of Oceanside, County of San Diego, California 92056

October 29, 2018

EEI Project AAA-72646.4

Corporate Office: 2195 Faraday Ave., Suite K, Carlsbad, CA 92008-7207 * Ph: 760-431-3747 www.eeitiger.com
Camarillo * Carlsbad * Pleasanton * Sacramento * Reno

GEOTECHNICAL EVALUATION

Prepared for:

Mr. Greg Spiro
Principal-Protea Capitol Partners
Protea Senior Living Oceanside, LLC
18 Ventana Ridge Drive
Aliso Viejo, CA 92656

Subject Property Location:

Protea Capital Partners
Proposed "Ocean Hills Phase 2" Senior Facility Development
4500 Cannon Rd.
Assessor's Parcel Number (APN): 169-562-01
City of Oceanside, County of San Diego, California 92056

Prepared by:

Matthew Cruz
Staff Geologist

CERTIFIED ENGINEERING GEOLOGIST
JEFFREY P. BLAKE
No. EG 2248
Exp. 10/31/19
STATE OF CALIFORNIA

Jeffrey P. Blake
CEG 2248 (exp. 10/31/19)
Principal Engineering Geologist

REGISTERED PROFESSIONAL ENGINEER
JERRY L. MICHAL
NO. 2515
Exp. 3-31-20
GEOTECHNICAL
STATE OF CALIFORNIA

Jerry L Michal

Jerry L. Michal
GE 2515 (exp. 3/31/20)
Senior Geotechnical Engineer

EEI
2195 Faraday Avenue, Suite K
Carlsbad, California 92008-7207

EEI Project AAA-72646.4

TABLE OF CONTENTS

TABLE OF CONTENTS (con't)

Distribution: (2) Addressee one electronic copy

1.0 INTRODUCTION

1.1 Purpose

The purpose of this Geotechnical Evaluation is to provide preliminary geotechnical information to Protea Senior Living Oceanside, LLC ("Client") regarding the subject property in the City of Oceanside, San Diego County, California. The information gathered in this evaluation is intended to provide the Client with an understanding of the physical conditions of site-specific subsurface soils, groundwater, and the regional geologic setting which could affect the cost or design of the proposed development at the property (**Figure 1** -Site Vicinity Map, **Figure 2**-Aerial Site Map).

This Geotechnical Evaluation has been conducted in general accordance with accepted geotechnical engineering principles and in general conformance with the approved proposal and cost estimate for the project by EEI, dated September 27, 2018.

EEI conducted onsite field exploration on October 9, 2018, that included drilling and sampling of thirteen (13) hollow-stem auger geotechnical borings for the proposed development at the subject property. We conducted two (2) percolation tests in conjunction with our field exploration. This Geotechnical Evaluation has been prepared for the sole use of Protea Senior Living Oceanside, LLC. Other parties, without the express written consent of EEI and Protea Senior Living Oceanside, LLC should not rely upon this Geotechnical Evaluation.

1.2 Project Description

Based on information provided by the Client (a site layout plan titled "Oceanside Senior Living: Site Plan" by Irwin Partners Architects, 2018), we understand that development of the subject property will consist of a new senior living facilities including 102 studio, one bedroom, and two bedroom apartments, a pool/spa area, lounge/sports bar, theater, patio spaces, dining room, gym, administrative buildings, paved parking and drive areas, a storm-water detention basin, and other related improvements. No other information is known at this time.

No detailed grading plans were provided to EEI at the time of our preparation of this report; however, grading is anticipated to include cuts and fills of less than 5 feet across the subject property (exclusive of remedial grading). No foundation plans were provided to EEI at the time of report preparation; however, foundation loads are assumed to be typical for the type of construction.

1.3 Scope of Services

The scope of our services included:

- A review of readily available data pertinent to the subject property, including published and unpublished geologic reports/maps, and soils data for the area (**References**).
- Conducting a geotechnical reconnaissance of the subject property and nearby vicinity.
- Coordination with Underground Service Alert (USA) to identify the presence of underground utilities for clearance of proposed boring locations.

- Drilling and logging of thirteen (13) small diameter exploratory borings in readily accessible areas of the subject property to depths of approximately 6 feet to 17.5 feet below the ground surface (bgs), including conducting percolation testing at two (2) of the boring locations. The approximate locations of each of our borings and percolation tests are presented on **Figure 3** (Geotechnical Map).

- An evaluation of seismicity and geologic hazards including an evaluation of faulting and liquefaction potential.

- Completion of laboratory testing of representative earth materials encountered onsite to ascertain their pertinent soils engineering properties, including corrosion potential (**Appendix B**).

- The preparation of this report which presents our preliminary findings, conclusions, and recommendations.

2.0 BACKGROUND

2.1 Subject Property Description

Based on the information provided by Client and a review of the GoogleEarth® online imagery, the overall subject property is located at 4500 Cannon Rd.; north of the intersection between Cannon Rd. and Mystra Dr. in the City of Oceanside, San Diego County, California. The property comprises roughly 6.3-acres and is identified by the Assessor's Parcel Number (APN) is 169-562-01-00. The southern part of the property is currently under development as Phase I of the Ocean Hills Senior Living Facility, and northern part of the property, which is the subject site of this report, is currently undeveloped, and is being currently being used as storage for heavy equipment and construction supplies. The property is bordered by Cannon Rd. to the southeast; Mystra Dr. to the west, and single-family residential developments to the north and east.

The center of the subject property is approximately situated at 33.1662° north latitude and 117.2690° west longitude (GoogleEarth®, 2018).

2.2 Topography

The subject property is located in the 7.5-minute San Luis Rey quadrangle. The property is relatively flat lying and the elevation is approximately 385 feet above sea level (USGS, 2018).

3.0 FIELD EXPLORATION, SUBSURFACE CONDITIONS AND LABORATORY TESTING

3.1 Field Exploration

Field work for our Geotechnical Evaluation was conducted on October 9, 2018. A total of thirteen (13) hollow-stem auger borings were advanced at the subject property in readily accessible areas. Boring depths ranged from approximately 6 to 17.5 feet bgs and were logged under the supervision of a Registered Professional Engineer and Certified Engineering Geologist at EEI. Refusal occurred in all of the borings. The approximate locations of the borings are shown on **Figure 3**.

A truck mounted CME-55 hollow-stem auger (HSA) drill rig was used to advance borings B-1/P-1 through B-13. Blow count (N) values were determined utilizing a 140-pound hammer, falling 30-inches onto a Standard Penetration Test (SPT) split-spoon sampler and a Modified California split-tube sampler.

The blows per 6-inch increment required to advance the 18-inch long SPT and 18-inch long Modified California split-tube samplers were measured at various depth intervals (varying between 2 to 10 feet), or at changes in lithology, recorded on the boring logs, and are presented in **Appendix A** (Soil Classification Chart and Boring Logs). Energy-corrected SPT N_{60} values are also presented on the borings logs.

Relatively "undisturbed" samples were collected in a 2.42-inch (inside diameter) California Modified split-tube sampler for visual examination and laboratory testing. The soils were classified in accordance with the Unified Soil Classification System (ASTM, 2015). Representative bulk samples were also collected for appropriate laboratory testing.

3.2 Laboratory Testing

Selected samples obtained from our borings were tested to evaluate pertinent soil classification and engineering properties and enable development of geotechnical conclusions and recommendations. The laboratory tests consisted of:

- Moisture Content and Dry Density
- Expansion Index
- Maximum Dry Density and Optimum Moisture
- Direct Shear
- R-Value
- Corrosivity

The results of the laboratory tests, and brief explanations of test procedures, are presented in **Appendix B**. It should be understood that the results provided in **Appendix B** are based upon pre-development conditions. Verification testing is recommended at the conclusion of grading on samples collected at or near finish grade.

4.0 GEOLOGIC SETTING AND SUBSURFACE CONDITIONS

4.1 Geologic Setting

Regionally, the subject property lies within the Peninsular Ranges Geomorphic Province of southern California. This province consists of a series of ranges separated by northwest trending valleys; sub parallel to branches of the San Andreas Fault (CGS, 2002). The Peninsular Ranges geomorphic province, one of the largest geomorphic units in western North America, extends from the Transverse Ranges geomorphic province and the Los Angeles Basin, south to Baja California. It is bound on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province. The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks (CGS, 2002). Major fault zones and subordinate fault zones found in the Peninsular Ranges Province typically trend in a northwest-southeast direction.

Regional geologic maps of the subject property and vicinity (Kennedy & Tan, 2007) indicate the property is underlain by sedimentary units consisting of sandstone, siltstone, claystone, and conglomerate of the Eocene Santiago Formation, and weathered to un-weathered Cretaceous Granitic rocks (map symbols Ts and Kg, respectively). Undocumented artificial fill is also anticipated to overlie the bedrock units across the subject property.

4.2 Subsurface Conditions

The subsurface materials encountered in our exploratory borings consisted of fill, alluvium, sedimentary formational deposits and granitic materials. A brief description of the subsurface conditions encountered is provided in the following section. Detailed descriptions of the subsurface conditions are provided on the boring logs included in **Appendix A**.

Undocumented Fill – Fill was encountered in all of our exploratory borings. The fill consisted of tan to brown to reddish brown silty sand, silty clay, clay, and sandy silt. Fragments of Santiago Formation siltstone and sandstone were encountered, and smaller fragments of granitics and claystone are common. These materials were observed to be typically damp to slightly moist and medium dense/stiff at the time of our subsurface exploration. The depth of fill is variable and generally ranged from approximately 4 to 11 feet bgs. We are not aware of any documentation of the fill placement. Therefore, the fill is considered undocumented and subject to removal and recompaction.

Quaternary-aged Alluvium – Quaternary-aged Alluvial deposits were encountered in exploratory borings B-6, B-9, B-11, B-12, and B-13 underlying the fill to maximum depths of approximately 13 feet bgs. These alluvial deposits consist of silty and clayey sand, sandy silt and gravelly sand to sandy gravel. The alluvial deposits are dark brown to black in color and contain roots and minor organic material. These materials were observed to be typically moist to wet and stiff/loose to medium dense at the time of our subsurface exploration.

Eocene Santiago Formation – The Eocene aged Santiago Formation was encountered in exploratory borings B-7 and B-9, underlying Fill/Alluvium at a depth of 9.5 to 13 feet bgs. The Santiago Formation consists of grayish-brown to reddish-brown claystone that has common orange-red oxidized streaks, and some gravel. The claystone excavates to clay, and was damp to moist and medium stiff to stiff at the time of our subsurface exploration.

Cretaceous Decomposed Granitics – Cretaceous aged granitic bedrock underlies the site and was encountered in exploratory borings B-1, B-2, B-3, B-4, B-5, B-6, B-8, B-11, and B-13 underlying fill and alluvium at depths of approximately 4 to 11 feet bgs. The granitics are reddish brown to dark brown mottled, and oxidized. The granitics were damp and very dense at the time of our subsurface exploration. Refusal was encountered in our borings in the granitic materials at depths of between approximately 6 to 17.5 feet.

4.3 Groundwater

Groundwater was not encountered in any of our HSA borings. It should be noted that variations in groundwater may result from fluctuations in the ground surface topography, subsurface stratification, rainfall, irrigation, and other factors that may not have been evident at the time of our subsurface exploration.

5.0 GEOLOGIC HAZARDS

5.1 California Building Code Seismic Design Parameters

EEI utilized seismic design criteria provided in the CBC (2016) and ASCE 7-10. Final selection of the appropriate seismic design coefficients should be made by the structural consultant based on the local laws and ordinances, expected building response, and desired level of conservatism. The site coefficients and adjusted maximum considered earthquake spectral response accelerations in accordance with the 2016 California Building Code are presented in **Table 1**.

TABLE 1
2016 CBC Seismic Parameters and Peak Ground Acceleration

Parameter	Value
Site Coordinates	Latitude 33.1662° Longitude -117.2690°
Mapped Spectral Acceleration Value at Short Period: $\mathbf{S_s}$	1.048g
Mapped Spectral Acceleration Value at 1-Second Period: $\mathbf{S_1}$	0.407g
Site Classification	C
Short Period Site Coefficient: $\mathbf{F_a}$	1.000
1-Second Period Site Coefficient: $\mathbf{F_v}$	1.393
Design Spectral Response Acceleration at Short Periods: $\mathbf{S_{DS}}$	0.699g
Design Spectral Response Acceleration at 1-Second Period: $\mathbf{S_{D1}}$	0.378g
Peak Ground Acceleration adjusted for Site Class Effects: $\mathbf{PGA_M}$	0.399g

5.2 Faulting and Surface Rupture

The subject property is located within an area of California known to contain a number of active and potentially active faults. There are no known active faults crossing the property (Jennings and Bryant, 2010) and the property is not within a State of California Earthquake Fault Zone (Hart and Bryant, 1997; CDMG, 2000). The closest known active fault is the Newport-Inglewood-Rose Canyon Fault Zone, located offshore approximately 8.39 miles west of the property (USGS, 2008). Therefore, the potential for surface rupture at the property is considered low. Three of the closest faults along with their distance from the property and Maximum Magnitude are shown in **Table 2.**

TABLE 2
Nearby Active Faults

Fault	Distance in Miles (Kilometers)[1]	Maximum Magnitude[1]
Newport-Inglewood-Rose Canyon (Offshore)	8.39 (13.50)	7.5
Elsinore	19.28 (31.03)	7.7
Coronado Bank (Offshore)	24.31 (39.12)	7.4
Palos Verde (Offshore)	24.31 (39.12)	7.7

1. USGS Online Fault Search (2008)

5.3 Landslides and Slope Stability

No landslides underlie the site nor are mapped in the immediate vicinity. As a result, we consider the potential for landslides or slope instabilities to occur at the property to be very low.

5.4 Liquefaction and Dynamic Settlement

Liquefaction occurs when loose, saturated sands and silts are subjected to strong ground shaking. The strong ground shaking causes pore-water pressure to rise and soils lose shear strength and temporarily behave as a liquid; potentially resulting in large total and differential ground surface settlements as well as possible lateral spreading during an earthquake.

Based on the shallow depth of dense to very dense bedrock materials and the lack of shallow groundwater underlying the site, the potential for liquefaction to occur is considered very low. Accordingly, the potential for liquefaction induced lateral spreading and seismic induced settlement is also considered to be very low.

5.5 Tsunamis, Flooding and Seiches

EEI reviewed the CGS Tsunami Inundation Map for the San Luis Rey quadrangle and determined that the subject property is not located within a Tsunami Evacuation Area; therefore, damage due to tsunamis and is considered low (CGS, 2009).

EEI reviewed the Federal Emergency Management Agency (FEMA, 2012) Flood Insurance Rate Map (FIRM) panels 06073C0767G to determine if the subject property was located within an area designated as a Flood Hazard Zone. The property is within Zone X described as an area determined to be outside the 0.2 percent annual chance floodplain; therefore, the damage due to flooding is considered low.

Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays, or reservoirs. The subject property is not located immediately adjacent to any lakes or confined bodies of water; therefore, the potential for a seiche to affect the site is considered low.

5.6 Expansive Soil

Laboratory test results indicate the near surface onsite soils have a low expansion potential (EI = 43). The expansion potential of these materials is not considered to pose a hazard for the proposed development.

6.0 CONCLUSIONS

Based on our field exploration, laboratory testing and engineering and geologic analysis, it is our opinion that the subject property is suitable for the proposed senior living residential development project from a geotechnical engineering and geologic viewpoint; however, there are existing geotechnical conditions associated with the property that will warrant mitigation and/or consideration during planning stages. If site plans and/or the proposed building locations are revised, additional field studies may be warranted to address proposed site-specific conditions. The main geotechnical conclusions for the project are presented in the following text.

- A total of thirteen (13) exploratory borings were advanced within the subject property during this evaluation. The boring depths ranged from 6 to 17.5 feet bgs. The property is underlain by undocumented fill, alluvium, the Eocene Santiago Formation and Cretaceous-aged granitics.

- Groundwater was not encountered in any of our exploratory borings to the maximum explored depth of 17.5 feet bgs.

- Standard heavy-duty grading equipment is anticipated to excavate the fill soils, as well as the alluvial deposits and Santiago formation; however, granitic bedrock materials that contain very dense and hard zones requiring heavy ripping with a single shank, or a "rock breaker" should be anticipated.

- The subject property is located within an area of southern California recognized as having a number of active and potentially-active faults located nearby. Our review indicates that there are no known active faults mapped as crossing the property and the property is not located within an Earthquake Fault Zone.

- Based on EEI's evaluation, Earth materials underlying the subject property are not considered susceptible to seismic settlement. The potential for liquefaction and seismic induced settlement are considered very low and are not considered a geotechnical concern.

- The onsite soils are predominantly silty sands and in general are anticipated to have a low expansion potential (EI ≤ 50). It should be noted, however, that localized clayey soils could potentially be expansive (EI > 50), and should be further evaluated during future studies or during earthwork when the proposed building pads are near finish grade.

- The existing fill and alluvial deposits are variable in density and are considered potentially compressible. As such, they are considered unsuitable for the support of settlement-sensitive structures or additional fill in their current condition. Therefore, these materials should be completely removed and recompacted in those areas to receive additional fill, proposed buildings and other settlement-sensitive improvements. Based on the results of our subsurface exploration, we anticipate that these removals will need to extend on the order of approximately 5 to 17 feet below existing site grades.

- A conventional shallow foundation system in conjunction with a concrete slab-on-grade floor appears to be suitable for support of the proposed residential buildings.

7.0 RECOMMENDATIONS

The recommendations presented herein should be incorporated into the planning and design phases of development. Guidelines for site preparation, earthwork, and onsite improvements are provided in the following sections.

7.1 General

Grading should conform to the guidelines presented in the 2016 California Building Code (CBC, 2016), as well as the requirements of the City of Oceanside. Additionally, general Earthwork and Grading Guidelines are provided herein as **Appendix E**.

During earthwork construction, removals and reprocessing of soft or unsuitable fill and alluvial materials, as well as general grading procedures of the contractor should be observed and the fill placed should be selectively tested by representatives of the geotechnical engineer, EEI. If any unusual or unexpected conditions are exposed in the field, they should be reviewed by the geotechnical engineer and if warranted, modified and/or additional recommendations will be offered. Specific guidelines and comments pertinent to the planned development are provided herein.

The recommendations presented herein have been completed using the preliminary information provided to us regarding site development. EEI should be provided with grading and foundation plans once they are available so that we can determine if the recommendations provided in this report remain applicable.

7.2 Site Preparation and Grading

Debris and other deleterious material, such as organic soils, tree rootballs and/or environmentally impacted earth materials (if any) should be removed from the subject property prior to the start of grading. All undocumented fill/backfill should be removed and recompacted. Areas to receive fill should be properly scarified and/or benched in accordance with current industry standards of practice and guidelines specified in the CBC (2016) and the requirements of the local jurisdiction.

Abandoned trenches should be properly backfilled and tested. If unanticipated subsurface improvements (utility lines, septic systems, wells, utilities, etc.) are encountered during earthwork construction, the Geotechnical Engineer should be informed and appropriate remedial recommendations would then be provided.

7.3 Remedial Earthwork

Remedial grading for the proposed residential building pads and for pavement and hardscape areas is provided in the following sections. Unless noted otherwise, fill should be moisture conditioned to at least the optimum moisture content and compacted to at least 90 percent of the maximum dry density (based on ASTM D1557).

Building Pads and other Settlement Sensitive Structures: The existing fill materials are undocumented, variable in density, possess variable expansion potential, and are considered potentially compressible. Underlying alluvial materials vary in density and moisture, and are also considered potentially compressible. As such, the fill and alluvial soils are considered unsuitable for the support of settlement-sensitive structures or additional fill in their current condition.

Based on this information, we recommend the removal (over-excavation) and re-compaction of the fill and alluvial materials within the proposed grading limits of the building pad areas and other settlement sensitive structures. Therefore, where not already removed by the proposed site grading, the existing undocumented fill and underlying alluvium should be completely removed and recompacted in those areas to receive additional fill, proposed buildings and other settlement-sensitive improvements in order to help reduce the expansion potential of locally clayey materials, and provide relatively uniform soil bearing conditions in the proposed development areas. Based on the results of our subsurface exploration and geotechnical evaluation, we recommend that the removals extend down to the relatively competent Santiago Formation or Granitic bedrock materials. Removals of the potentially compressible materials identified herein are anticipated to range from approximately 5 to 15 feet. The removals should extend to a minimum of 5 feet bgs or 18-inches below the bottom of foundations, whichever is deeper in the proposed building area. The remedial earthwork should extend a minimum of 5 feet beyond the proposed area to support fill and/or settlement sensitive improvements.

The resulting excavation(s) for the removals should be observed by a representative of EEI to check that unsuitable materials have been sufficiently removed. It should be understood that based on the observations of our field representative, localized deeper removals may be recommended. The base of the removal area should be level to avoid differential fill thicknesses under proposed improvements. Note that vertical sides exceeding five feet in depth may be prone to sloughing and may require laying back to an inclination of 1:1 (horizontal to vertical). Some locations that are close to property lines and existing improvements may require temporary shoring or slot cutting methods. The base of the removals should be scarified to a minimum depth of 6-inches, moisture conditioned as needed to achieve at least optimum moisture content and re-compacted to at least 90 percent of the maximum dry density (based on ASTM D1557). The over-excavated areas should then be backfilled with onsite and/or imported soils that are placed and compacted as recommended herein until design finish grades are reached.

Other Settlement Sensitive Structures: Similar remedial grading should be performed below other settlement sensitive improvements such as retaining walls and street improvements, pool areas and hardscape areas. If over-excavations for improvements are not performed in these areas, these improvements may be subject to settlement.

7.4 Fill Material and Placement

Fill materials should be compacted to at least 90 percent of the maximum dry density (based on ASTM D1557). Unless noted otherwise, fill should be moisture conditioned to at least 2 percent above the optimum moisture content and compacted to at least 90 percent of the maximum dry density (based on ASTM D1557). Fill material should be free of organic matter (less than 3 percent organics by weight) and other deleterious material. Fill material should not contain rocks greater than 6-inches in maximum dimension, organic debris and other deleterious materials. Rock fragments exceeding 6-inches in one dimension should be segregated and exported from the subject property or utilized for landscaping.

Conventional Shallow Foundations with Slab on Grade: Fill within 4 feet of pad grade should consist of low expansion potential material (EI < 50). The low-expansion potential material should extend at least 5 feet beyond the building perimeter.

Hardscape: Fill within 2 feet of hardscape subgrade should consist of low-expansive material (EI < 50). The low-expansion potential material should extend at least 2 feet beyond the hardscape.

If import soils are needed, the earthwork contractor should ensure that all proposed fill materials are approved by the Geotechnical Engineer prior to use. Representative soil samples should be made available for testing at least ten (10) working days prior to hauling to the property to allow for laboratory tests.

Those areas to receive fill or surface improvements should be scarified at least 6-inches; moisture conditioned to at least 2 percent over optimum moisture content and re-compacted to at least 90 percent of the maximum dry density (based on ASTM D1557). The subgrade should be thoroughly and uniformly moistened prior to placing concrete.

7.5 Expansive Soil

The onsite soils are anticipated to possess a low expansion potential (EI=21-50). The recommendations presented in this report reflect a low expansion potential.

7.6 Yielding Subgrade Conditions

The soils encountered at the subject property can exhibit "pumping" or yielding if they become saturated. This can often occur in response to periods of significant precipitation, such as during the winter rainy season. If this occurs and in order to help stabilize the yielding subgrade soils within the bottom of the removal areas, the contractor can consider the placement of stabilization fabric or geo-grid over the yielding areas, depending on the relative severity. Mirafi 600X (or approved equivalent) stabilization fabric may be used for areas with low to moderate yielding conditions.

Geo-grid such as Tensar TX-5 may be used for areas with moderate to severe yielding conditions. Uniform sized, ¾- to 2-inch crushed rock should be placed over the stabilization fabric or geo-grid. A 6- to 12-inch thick section of crushed rock will typically be necessary to stabilize yielding ground.

If significant voids are present in the crushed gravel, a filter fabric should be placed over the crushed gravel to prevent migration of fines into the gravel and subsequent settlement of the overlying fill. Fill soils, which should be placed and compacted in accordance with the recommendations presented herein, should then be placed over the fabric or geo-grid until design finish grades are reached. The crushed gravel and stabilization fabric or geo-grid should extend at least 5 feet laterally beyond the limits of the yielding areas. These operations should be performed under the observation and testing of a representative of EEI in order to evaluate the effectiveness of these measures and to provide additional recommendations for mitigation, as necessary.

7.7 Shrinkage and Bulking

Several factors will impact earthwork balancing on the subject property, including shrinkage, bulking, subsidence, trench spoils from utilities and footing excavations, and final pavement section thickness as well as the accuracy of topography. Shrinkage, bulking and subsidence are primarily dependent upon the degree of compactive effort achieved during construction. Shrinkage, bulking and subsidence should be considered by the project civil engineer relative to final site balancing. It is recommended that the site development be planned to include an area that could be raised or lowered to accommodate final site balancing.

7.8 Temporary Site Excavations

Based on the results of our subsurface exploration, we anticipate that excavations can generally be accomplished by conventional heavy duty earth moving equipment in good working condition. However, excavations may encounter localized harder, cemented zones that may require air hammer attachments to excavators, or specialized excavation equipment. Excavations in the onsite materials could generate oversize materials. Oversize materials should be placed in accordance with **Section 7.5** and the Earthwork and Grading Guidelines.

Temporary excavations within the onsite materials (considered to be a Type C soil per OSHA guidelines) should be stable at 1.5H:1V inclinations for short durations during construction, and where cuts do not exceed 15 feet in height. Some sloughing of surface soils should be anticipated. Temporary excavations 4 feet deep or less can be made vertically.

The faces of temporary slopes should be inspected daily by the contractor's Competent Person before personnel are allowed to enter the excavation. Any zones of potential instability, sloughing or raveling should be brought to the attention of the Engineer and corrective action implemented before personnel begin working in the excavation.

Excavated soils should not be stockpiled behind temporary excavations within a distance equal to the depth of the excavation. EEI should be notified if other surcharge loads are anticipated so that lateral load criteria can be developed for the specific situation. If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to prevent runoff water from entering the excavation and eroding the slope faces.

8.0 FOUNDATION RECOMMENDATIONS

8.1 General

In the event that plans concerning the proposed building structures are revised in the project design and/or location or loading conditions of the planned structures are made, conclusions and recommendations contained in this report should not be considered valid unless they are reviewed, revised and/or approved in writing by EEI.

8.2 Preliminary Foundation Design

The following design parameters assume that the minimum recommended remedial grading will be performed, and that foundations for the proposed residential buildings will consist of conventional shallow foundations with a slab on grade. The foundation recommendations provided herein are based on the soil materials within 30-inches of foundation level possessing a low expansion potential (EI<50). Recommendations by the project's design-structural engineer or architect may exceed the following minimum recommendations.

In preparation for foundation construction, the earthwork contractor should ensure that the site has been prepared as recommended, and that field density tests have been performed to adequately document the relative compaction of structural fill. Foundation design recommendations for the proposed structure is provided in the following sections of this report.

8.2.1 Conventional Shallow Foundations

For proposed one-story wood frame residential buildings, conventional continuous and/or isolated shallow spread footings should bear entirely on compacted fill with remedial grading as described in previous sections of this report. Foundations should be constructed with an embedment of at least 12-inches below finish grade and a minimum width of 12-inches. Isolated footings should have a minimum width of 24-inches. An allowable bearing capacity of 2,000 pounds per square foot (psf) can be used for footings extending at least 12-inches below lowest adjacent finished grade. The allowable bearing may be increased by 750 psf for each additional 12-inches of embedment up to a maximum bearing of 3,000 psf. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces.

For proposed two-story wood frame residential buildings, conventional continuous and/or isolated shallow spread footings should bear entirely on compacted fill with remedial grading as described in previous sections of this report. Foundations should be constructed with an embedment of at least 18-inches below finish grade and a minimum width of 15-inches. Isolated footings should have a minimum width of 24-inches. An allowable bearing capacity of 2,000 pounds per square foot (psf) can be used for footings extending at least 12-inches below lowest adjacent finished grade. The allowable bearing may be increased by 750 psf for each additional 12-inches of embedment up to a maximum bearing of 3,000 psf. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces.

For proposed three-story wood frame residential buildings, conventional continuous and/or isolated shallow spread footings should bear entirely on compacted fill with remedial grading as described in previous sections of this report. Foundations should be constructed with an embedment of at least 24-inches below finish grade and a minimum width of 18-inches. Isolated footings should have a minimum width of 24-inches. An allowable bearing capacity of 2,000 pounds per square foot (psf) can be used for footings extending at least 24-inches below lowest adjacent finished grade. The allowable bearing may be increased by 750 psf for each additional 12-inches of embedment up to a maximum bearing of 3,000 psf. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces.

Based on the prevailing geotechnical conditions encountered during our geotechnical evaluation as described herein, we recommend that foundations be reinforced with at least two No. 4 bars, one placed at the top of the footing and one placed at the bottom.

The recommendations for footings sizes and reinforcement are considered minimums and are not intended to supersede the design of the project structural engineer.

8.3 Lateral loads

Lateral loads will be resisted by friction between the bottoms of foundations and passive pressure on the faces of footings and other structural elements below grade. An allowable passive pressure of 300 psf per foot of depth can be used for the portion of the foundation below grade. An allowable coefficient of friction of 0.30 can be used. The passive pressure can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. The upper one-foot of soil should not be relied on for passive support unless the ground is covered with pavements or slabs.

8.4 Settlement

Settlement estimates for conventional foundations are as follows:

- Static Total Settlement: Less than 1-inch
- Static Differential Settlement: Less than ½-inch over a distance of 40 feet

8.5 Footing Setbacks

Footings adjacent to unlined drainage swales or underground utilities (if any) should be deepened to a minimum of 6-inches below the invert of the adjacent unlined swale or utilities. This distance is measured from the footing face at the bearing elevation. Footings for structures adjacent to retaining walls should be deepened so as to extend below a 1:1 projection from the heel of the wall. Alternatively, walls may be designed to accommodate structural loads from buildings or appurtenances.

8.6 Conventional Retaining Walls

8.6.1 Foundations

The recommendations provided in the conventional foundation section of this report are also applicable to conventional retaining walls.

8.6.2 Lateral Earth Pressure

The following parameters are based on the use of low-expansion potential backfill materials within a 1:1 (H:V) line projected from the heel of the retaining wall.

The active earth pressure for the design of unrestrained earth retaining structures with level backfills can be taken as equivalent to the pressure of a fluid weighing 40 pcf. The at-rest earth pressure for the design of restrained earth retaining structures with level backfills can be taken as equivalent to the pressure of a fluid weighing 60 pcf. The above values assume a granular and drained backfill condition. Higher lateral earth pressures would apply if walls retain expansive clay soils. An additional 20 pcf should be added to these values for walls with a 2:1 (H:V) sloping backfill. An increase in earth pressure equivalent to an additional 2 feet of retained soil can be used to account for surcharge loads from light traffic. The above values do not include a factor of safety. Appropriate factors of safety should be incorporated into the design. Surcharge due to other loading within an approximate 1½:1 (H:V) projection from the back of the wall will increase the lateral pressures provided above and should be incorporated into the wall design.

Retaining walls should be designed to resist hydrostatic pressures or be provided with a back-drain to reduce the accumulation of hydrostatic pressures. Back-drains may consist of a two-foot wide zone of ¾-inch crushed rock. The back-drain should be separated from the adjacent soils using a non-woven filter fabric, such as Mirafi 140N or equivalent. Weep holes should be provided or a perforated pipe (Schedule 40 PVC) should be installed at the base of the back-drain and sloped to discharge to a suitable storm drain facility. As an alternative, a geo-composite drainage system such as Miradrain 6000 or equivalent placed behind the wall and connected to a suitable storm drain facility can be used. The project architect should provide waterproofing specifications and details.

8.6.3 Seismic Earth Pressure

Where required, seismic earth pressures can be taken as equivalent to the pressure of a fluid weighing 44 pounds per cubic foot (pcf) for flexible walls and 79 pcf for stiff walls. These values are for level backfill conditions and do not include a factor of safety. Sloping backfill will increase wall pressures. Appropriate factors of safety should be incorporated into the design.

The seismic pressure is in addition to the un-factored static active pressures. The allowable passive pressure and bearing capacity can be increased by ⅓ in determining the stability of the wall.

8.7 Interior Slabs-on-Grade

The project structural engineer should design the interior concrete slab-on-grade floor. We recommend that building slabs be at least 4-inches in thickness and that consideration be given to the slab being reinforced with No. 3 bars spaced 18-inches on center, each way, and placed at slab mid-height, or the slab reinforcement in accordance with the structural engineers design. Subgrade materials should not be allowed to desiccate between grading and the construction of the concrete slabs. The floor slab subgrade should be thoroughly and uniformly moistened prior to placing concrete.

A moisture vapor retarder/barrier should be placed beneath slabs where moisture sensitive floor coverings will be installed. Typically, plastic is used as a vapor retardant. If plastic is used, a minimum 10-mil is recommended. The plastic should comply with ASTM E1745. Plastic installation should comply with ASTM E1643.

Current construction practice typically includes placement of a 2-inch thick sand cushion between the bottom of the concrete slab and the moisture vapor retarder/barrier. This cushion can provide some protection to the vapor retarder/barrier during construction and may assist in reducing the potential for edge curling in the slab during curing. However, the sand layer also provides a source of moisture vapor

to the underside of the slab that can increase the time required to reduce moisture vapor emissions to limits acceptable for the type of floor covering placed on top of the slab. The slab can be placed directly on the vapor retarder/barrier. The floor covering manufacturer should be contacted to determine the volume of moisture vapor allowable and any treatment needed to reduce moisture vapor emissions to acceptable limits for the particular type of floor covering installed. The project team should determine the appropriate treatment for the specific application.

8.8 Exterior Slabs-on-Grade (Hardscape)

The top 24-inches of soil below exterior concrete slabs-on-grade should have an expansion index of 50 or less. Exterior slabs should have a minimum thickness of 4-inches and consideration given to be reinforced with at least No. 3 bars at 24-inches on center each way. Slabs should be provided with weakened plane joints. Joints should be placed in accordance with the American Concrete Institute (ACI) guidelines. Proper control joints should be provided to reduce the potential for damage resulting from shrinkage. Subgrade materials should not be allowed to desiccate between grading and the construction of the concrete slabs. The floor slab subgrade should be thoroughly and uniformly moistened prior to placing concrete.

All dedicated exterior flatwork should conform to standards provided by the governing agency including section composition, supporting material thickness and any requirements for reinforcing steel. Concrete mix proportions and construction techniques, including the addition of water and improper curing, can adversely affect the finished quality of the concrete and result in cracking and spalling of the slab. We recommend that all placement and curing be performed in accordance with procedures outlined by the American Concrete Institute and/or Portland Cement Association. Special consideration should be given to concrete placed and cured during hot or cold weather conditions.

8.9 Corrosivity

One sample of the onsite soils was tested to provide a preliminary indication of the corrosion potential of the onsite soils. The test results are presented in **Appendix B**. A brief discussion of the corrosion test results is provided in the following section.

- The sample tested had a soluble sulfate concentration of 0.025 percent, which indicates the sample has a negligible sulfate corrosion potential relative to concrete.

- It should be noted that soluble sulfate in the irrigation water supply, and/or the use of fertilizer may cause the sulfate content in the surficial soils to increase with time. This may result in a higher sulfate exposure than that indicated by the test results reported herein. Studies have shown that the use of improved cements in the concrete, and a low water-cement ratio will improve the resistance of the concrete to sulfate exposure.

- The sample tested had a chloride concentration of 0.026 percent, which indicates the sample has a negligible chloride corrosion potential relative to metal.

- The sample tested had a minimum resistivity of 520 ohm-cm, which indicates the sample is extremely corrosive to ferrous metals.

- The sample tested had a pH of 7.0, which indicates the sample is neutral.

Additional testing should be performed after grading to evaluate the as-graded corrosion potential of the onsite soils. We are not corrosion engineers. A corrosion consultant should be retained to provide corrosion control recommendations if deemed necessary.

9.0 PRELIMINARY PAVEMENT DESIGN RECOMMENDATIONS

Deleterious material, excessively wet or dry pockets, concentrated zones of oversized rock fragments, and any other unsuitable yielding materials encountered during grading should be removed. Once compacted fill and/or native soils are brought to the proposed pavement subgrade elevations, the subgrade should be proof-rolled in order to check for a uniform firm and unyielding surface. Representatives of the project Geotechnical Engineer should observe all grading and fill placement.

The upper 12-inches of pavement subgrade soils should be scarified; moisture conditioned to at least optimum moisture content and compacted to at least 95 percent of the laboratory standard (ASTM D1557). If loose or yielding materials are encountered during subgrade preparation, evaluation should be performed by EEI. Aggregate base materials should be properly prepared (i.e., processed and moisture conditioned) and compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557. Aggregate base materials should conform to Caltrans specifications for Class 2 aggregate base.

All pavement section changes should be properly transitioned. Although not anticipated, if adverse conditions are encountered during the preparation of subgrade materials, special construction methods may need to be employed. A representative of the project Geotechnical Engineer should be present for the preparation of subgrade and aggregate base.

For design purposes we have assumed a Traffic Index (TI) of 5.0 for the drive areas and entrance aprons at the subject property. This assumed TI should be verified as necessary by the Civil Engineer or Traffic Engineer. Based on the results of R-Value testing of the upper materials at the property, we have assumed a preliminary R-Value of 9 for the materials likely to be present at rough grades. The modulus of subgrade reaction (K-Value) was estimated at 70 pounds per square inch per inch (psi/in) for an R-Value of 9 (Caltrans, 1974). Pavement design was calculated for the parking lot structural section requirements for asphaltic concrete in accordance with the guidelines presented in the Caltrans Highway Design Manual. Rigid pavement sections were evaluated in general accordance with ACI 330R-08, based on an average daily truck traffic value of 10.

TABLE 3
Pavement Design Recommendations- Non-Permeable Flexible and Rigid Pavement

Traffic Index (TI) and Location	Pavement Surface	Aggregate Base Material (1)
5.0 – Main Drive Area	3-inches Asphalt Concrete	9-inches
4.5- Parking and Drive Areas	3-inches Asphalt Concrete	8-inches
Concrete Pavement - Parking Areas	5.0-inches Portland Cement Concrete (2)	4.0-inches
Concrete Pavement –Drive areas	6-inches Portland Cement Concrete (2)	6.0-inches
Concrete Pavement- Drive Approach/Heavy Truck-Trash Truck Pads/Trash Enclosure	7.0-inches Portland Cement Concrete (2)	6.0-inches

(1) R-Value of 78 for Caltrans Class II aggregate base
(2) Reinforcement and control joints placed in accordance with the pavement or structural engineer's requirements

The recommended pavement sections provided in **Table 3** are intended as a minimum guideline. If thinner or highly variable pavement sections are constructed, increased maintenance and repair could be expected. If the actual ADT (average daily traffic), ADTT (average daily truck traffic), or traffic index (TI) increases beyond our assumed values, increased maintenance and repair could be required for the pavement section. Final pavement design should be verified by testing of soils exposed at subgrade after grading has been completed. Thicker pavement sections could result if R-Value testing indicates lower values.

10.0 DEVELOPMENT RECOMMENDATIONS

10.1 Landscape Maintenance and Planting

Water is known to decrease the physical strength of earth materials, significantly reducing stability by high moisture conditions. Surface drainage away from foundations and graded slopes should be maintained. Only the volume and frequency of irrigation necessary to sustain plant life should be applied.

Consideration should be given to selecting lightweight, deep rooted types of landscape vegetation which require low irrigation that are capable of surviving the local climate. From a soils engineering viewpoint, "leaching" of the onsite soils is not recommended for establishing landscaping. If landscape soils are processed for the addition of amendments, the processed soils should be re-compacted to at least 90 percent relative compaction (based on ASTM D1557).

10.2 Site Drainage

Positive site drainage should be maintained at all times. Drainage should not flow uncontrolled over slopes. Runoff should be channeled away from slopes and structures and not allowed to pond and/or seep uncontrolled into the ground. Pad drainage should be directed toward an acceptable outlet. Consideration should be given to eliminating open bottom planters directly adjacent to proposed structures for a minimum distance of 10 feet. As an alternative, closed-bottom type planters could be utilized, with a properly designed drain outlet placed in the bottom of the planter.

Final surface grades around structures should be designed to collect and direct surface water away from structures and toward appropriate drainage facilities. The ground around the structure should be graded so that surface water flows rapidly away from the structure without ponding. In general, we recommend that the ground adjacent to the structure slope away at a gradient of at least 2 percent. Densely vegetated areas where runoff can be impaired should have a minimum gradient of at least 5 percent within the first 5 feet from the structure. Roof gutters with downspouts that discharge directly into a closed drainage system are recommended on structures. Drainage patterns established at the time of fine grading should be maintained throughout the life of the proposed structures.

10.3 Site Runoff Considerations - Stormwater Disposal Systems

It is our understanding that the Client is considering that runoff generated from the facility to be disposed of in engineered subsurface features onsite. We performed percolation testing in order to provide an indication of the infiltration characteristics of the onsite materials. Our testing and findings are summarized in the following sections.

10.3.1 Percolation Testing

Two percolation tests were performed onsite: B-1/P-1 and B-4/P-2 were performed during the subsurface exploration on October 9, 2018, at the location of the proposed detention basin in the western part of the property. Following the drilling of exploratory borings B-1/P-1 and B-4/P-2, a 3-inch diameter perforated polyvinyl chloride (PVC) pipe was placed in the hole and gravel was placed around the pipe. The test holes were presoaked in general accordance with the City of Oceanside BMP guidelines (City of Oceanside, 2016).

Percolation testing was performed until consistent results were obtained. The results were used to calculate the pre-adjusted percolation rate for the test hole. Upon conclusion of testing, the perforated pipe was removed from the test hole and the test hole was backfilled.

We note that a soil profile's percolation rate is not the same as its infiltration rate. Therefore, the measured/calculated field percolation rate was converted to an estimated infiltration rate utilizing a reduction factor determined using the Porchet method. Additionally, as indicated in the County of San Diego BMP guidelines (County of San Diego, 2016) and City of Oceanside BMP

Guidelines (2016), a feasibility factor of safety of 2.0 is should be applied to the measured infiltration rates to account for remaining uncertainty and long-term deterioration that cannot be technically mitigated. The following **Table 4** presents the measured percolation rates and corresponding infiltration rates calculated for test holes B-1/P-1 and B-4/P-2.

TABLE 4
Summary of Percolation Testing

Location	Depth (ft.)	Pre-Adjusted Percolation Rate (in/hr)	Infiltration Rate* (in/hr)
B-1/P-1	~ 15	4.80	0.21/0.11*
B-4/P-2	~ 9	2.40	0.22/0.11*

*Feasibility factor of safety of 2.0 is included

10.3.2 Summary of Findings

The County of San Diego/Oceanside BMP guidelines indicate that onsite storm-water disposal systems can be designed for "Full-Infiltration" for subsurface materials with corrected infiltration rates equal to or greater than 0.5-inches per hour, and for "Partial Infiltration" for corrected infiltration rates less than 0.5-inches per hour. With the 2.0 factor of safety applied the estimated infiltration rate from both B-1/P-1 and B-4/P-2 are less than 0.5-inches per hour. It is our conclusion that the on-site soils in the areas tested appear unsuitable for direct storm water full infiltration per the City of Oceanside/ County of San Diego's BMP guidelines.

We provide the following conclusions regarding the percolation test results:

- It is our opinion that the percolation characteristics at the tested depths and locations are generally representative of the site conditions in the vicinity of the test holes. Percolation testing was performed within decomposed granitic bedrock materials.

- As discussed in the County of San Diego/Oceanside BMP guidelines for percolation testing, the bottom of the borings where the percolation tests are performed should be at approximately the same depth of the invert of the proposed infiltration facility. The project civil engineer should determine if the tests performed meet this requirement.

- As discussed in the County of San Diego/Oceanside BMP guidelines, a correction factor should be applied to the measured infiltration rates to account for soil assessment method, soil type, soil variability, depth to groundwater, level of pretreatment, redundancy, and compaction during construction. The project civil engineer should determine the appropriate design-level factor of safety for the proposed disposal system.

Design of the stormwater disposal system should be in accordance with the City of Oceanside BMP Guidelines/County of San Diego guidelines. The completed form I-8 of the San Diego Region Model BMP Design Manual is included as **Appendix D**.

10.3.3 Structure Setback from Retention Devices

We recommend that storm-water disposal systems be situated at least three times their depth, or a minimum of 15 feet (whichever is greater), from the outside bottom edge of structural foundations. Structural foundations include (but are not limited to) buildings, loading docks, retaining walls, and screen walls. The invert of storm-water infiltration should be outside a 1:1 (H:V) plane projected from the bottom of adjacent foundations.

Stormwater disposal systems should be checked and maintained on regular intervals. Stormwater devices including bio-swales that are located closer than 10 feet from any foundations/footings should be lined with an impermeable membrane to reduce the potential for saturation of foundation soils. Foundations may also need to be deepened.

Storm water infiltration should not be located near utility lines where the introduction of storm water could cause damage to utilities or settlement of trench backfill.

10.4 Additional Site Improvements

Recommendations for additional grading can be provided upon request. If in the future, additional property improvements are planned for the subject property, recommendations concerning the design and construction of improvements would be provided upon request.

10.5 Utility Trench Backfill

Fill around the pipe should be placed in accordance with details shown on the drawings and should be placed in layers not to exceed 8-inches loose (unless otherwise approved by the geotechnical engineer) and compacted to at least 90 percent of the maximum dry density as determined in accordance with ASTM D1557 (Modified Proctor). The geotechnical engineer should approve all backfill material. Select material should be used when called for on the drawings, or when recommended by the geotechnical engineer. Care should be taken during backfill and compaction operations to maintain alignment and prevent damage to the joints. The backfill should be kept free from oversized material, chunks of highly plastic clay, or other unsuitable or deleterious material. Backfill soils should be non-expansive, non-corrosive, and compatible with native earth materials. Backfill materials and testing should be in accordance with the CBC (2016), and the requirements of the local governing jurisdiction.

Pipe backfill areas should be graded and maintained in such a condition that erosion or saturation will not damage the pipe bedding or backfill. Flooding trench backfill is not recommended. Heavy equipment should not be operated over any pipe until it has been properly backfilled with a minimum of 2 to 3 feet of cover. The utility trench should be systematically backfilled to allow maximum time for natural settlement. Backfill should not occur over porous, wet, or spongy subgrade surfaces. Should these conditions exist, the areas should be removed, replaced and recompacted.

11.0 PLAN REVIEW

Once detailed grading and foundation plans are available, they should be submitted to EEI for review and comment, to reduce the potential for discrepancies between plans and recommendations presented herein. If conditions found differ substantially from those stated; appropriate recommendations will be provided. Additional field studies may be warranted.

12.0 LIMITATIONS

This Geotechnical Evaluation has been conducted in accordance with generally accepted geotechnical engineering principles and practices. Findings provided herein have been derived in accordance with current standards of practice, and no warranty is expressed or implied. Standards of practice are subject to change with time. This report has been prepared for the sole use of Protea Senior Living Oceanside, LLC (Client), within a reasonable time from its authorization.

Subject property conditions, land use (both onsite and offsite), or other factors may change as a result of manmade influences, and additional work may be required with the passage of time. This Geotechnical Evaluation should not be relied upon by other parties without the express written consent of EEI and the Client; therefore, any use or reliance upon this Geotechnical Evaluation by a party other than the Client should be solely at the risk of such third party and without legal recourse against EEI, its employees, officers, or directors, regardless of whether the action in which recovery of damages is brought or based upon contract, tort, statue, or otherwise. The Client has the responsibility to see that all parties to the project, including the designer, contractor, subcontractor, and building official, etc. are aware of this report in its complete form. This report contains information that may be used in the preparation of contract specifications; however, the report is not designed as a specification document, and may not contain sufficient information for use without additional assessment. EEI assumes no responsibility or liability for work or testing performed by others. In addition, this report may be subject to review by the controlling authorities.

13.0 REFERENCES

American Society of Civil Engineers (ASCE), 2010, Minimum Design Loads for Buildings and Other Structures, ASCE Document ASCE/SEI 7-10.

American Society for Testing and Materials (ASTM), 2015, Annual Book of ASTM Standards, Volume 04.08, Construction: Soil and Rock (I), Standards D 420 - D 5876.

California Building Code (CBC), 2016, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, California Building Standards Commission, Based on 2015 International Building Code; 2016 California Historical Building Code, Title 24, Part 8; and 2013 California Existing Building Code, Title 24, Part 10, effective January 1, 2017.

California Department of Transportation (Caltrans), 1974, Highway Design Manual, dated October 1, 1974.

California Division of Mines and Geology (CDMG), 2000, California Department of Conservation, Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region, DMG CD 2000-003.

California Geological Survey (CGS), 2002, California Geomorphic Provinces Note 36, Electronic Copy, Revised December 2002.

California Geological Survey (CGS), 2009, Tsunami Inundation Map for Emergency Planning: San Luis Rey Quadrangle, California Geological Survey and University of Southern California, dated June 1, 2009, scale 1:24,000.

City of Oceanside, 2016, Oceanside BMP Design Manual, Oceanside Department of Public Works, dated February 2016.

County of San Diego, 2016, Model Best Management Practices (BMP) Design Manual, San Diego Region, For Permanent Site Design, Storm Water Treatment and Hydromodification Management, dated February 2016.

Federal Emergency Management Agency (FEMA), 2012, Flood Insurance Rate Map 06073C0767G, San Diego County, California, dated May 16, 2012.

Google Earth®, 2018, Version 7.1.5.1557.

Hart, E.W., and Bryant, W.A. (Hart and Bryant), 1997, Fault-Rupture Hazard Zones in California: California Department of Conservation, Division of Mines and Geology, Special Publication 42.

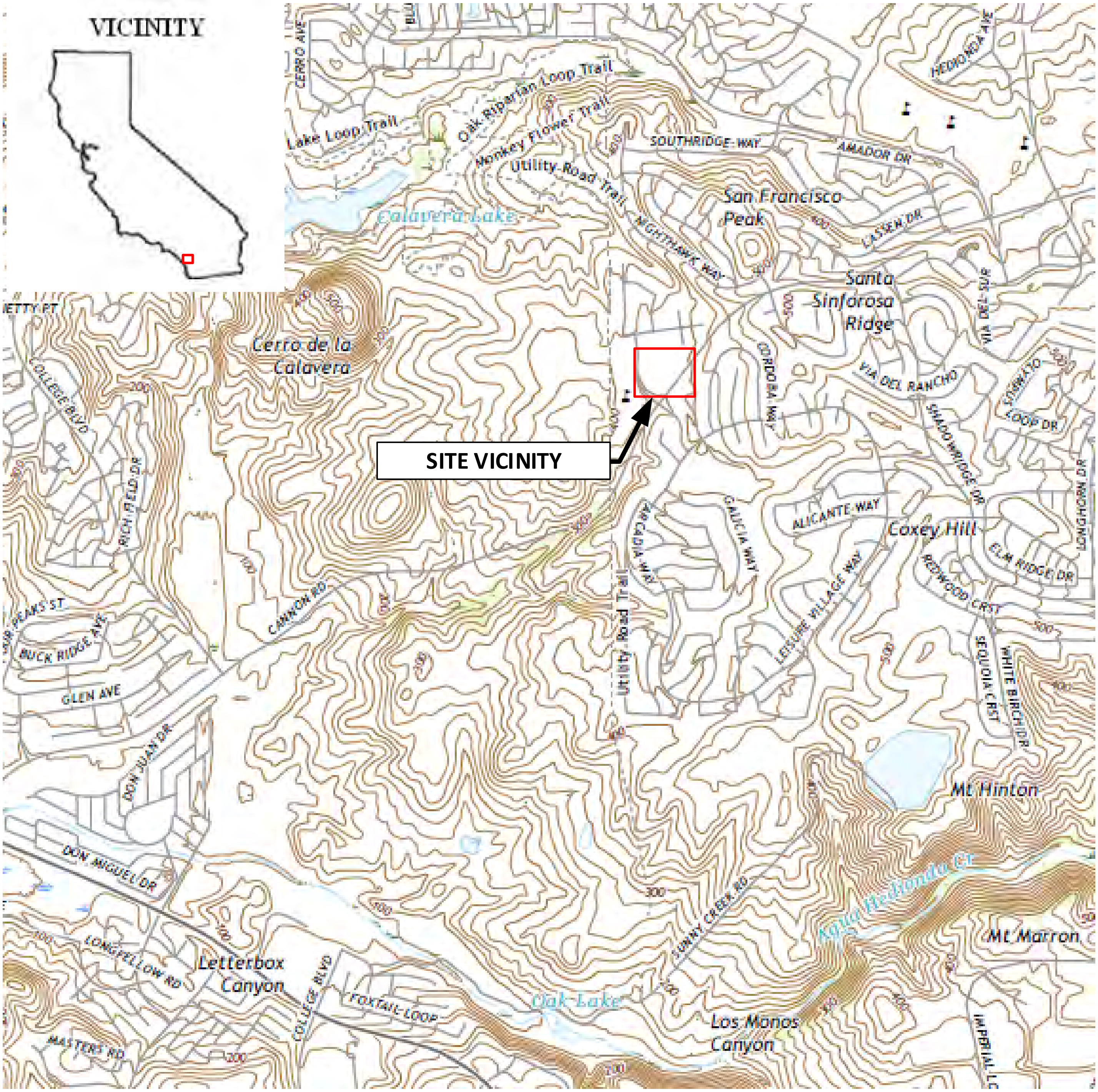
Jennings, C.W., and Bryant, W.A., (Jennings and Bryant) 2010, Fault Activity Map of California and Adjacent Areas: California Geologic Survey, Map Sheet No. 6, scale 1:750,000.

Kennedy, M.P., and S.S. Tan, 2007, Geologic Map of the Oceanside 30' x 60' Quadrangle, California, California Geological Survey, Regional Geologic Map Series No. 2, scale 1:100,000.

United States Geological Survey (USGS), 2018, 7.5 Minute Topographic Map, San Luis Rey, California Quadrangle, scale 1:24,000.

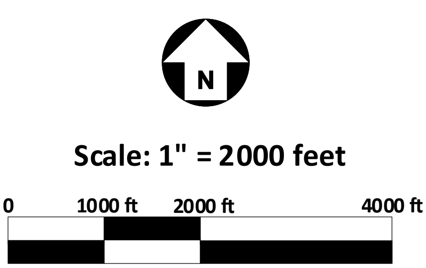
United States Geological Survey (USGS), 2008, 2008 National Seismic Hazard Maps – Online Fault Database Search, web address < http://earthquake.usgs.gov/hazards/products/conterminous/>, accessed June 2016.

FIGURES



Source: USGS San Luis Rey 7.5-minute quadrangle, 2018

LEGEND



Scale: 1" = 2000 feet

Note: All Locations Are Approximate

SITE VICINITY MAP

Protea Senior Living Oceanside, LLC

Ocean Hills Phase II Development

4500 Cannon Rd.

Oceanside, CA

EEI Project No. AAA-72646.4

Created October 2018

EEI Engineering Solutions

FIGURE 1

Scale: 1" = 400'

0 200 ft 400 ft 240 ft

Note: All Locations Are Approximate

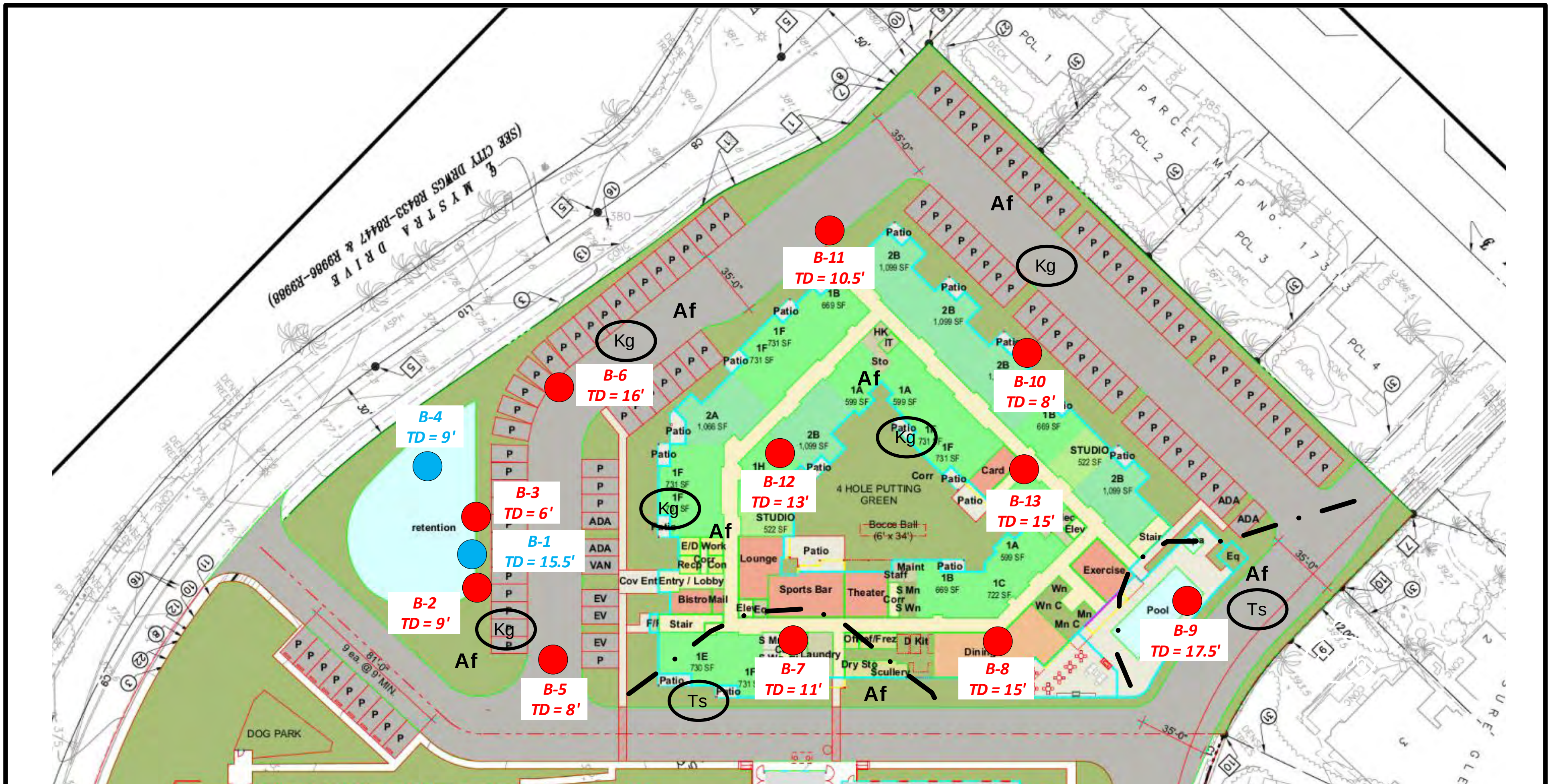
AERIAL SITE MAP

Protea Senior Living Oceanside, LLC
Ocean Hills Phase II Development
4500 Cannon Rd.
Oceanside, CA
EEI Project No. AAA-72646.4
Created October 2018

EEI Engineering Solutions

FIGURE 2

Source: Google Earth, 2018



Source: Irwin Partners Architects, Site Plan, 2018

LEGEND

B-2 (red circle)	*Approximate Boring Locations with Total Depth (TD)*
B-1 (blue circle)	*Approximate Boring/Percolation Test Location with Total Depth (TD)*
Af	*Undocumented Artificial Fill*
Ts	*Approximate Location of Eocene Santiago Formation; Circled where buried*
Kg	*Approximate Location of Cretaceous Granitics; Circled where buried*
— · —	*Approximate Subsurface Geologic Contact*

0 FT 80 FT 160 FT

Note: All Locations Are Approximate

Scale: 1" = 80'

N

GEOTECHNICAL MAP

Protea Senior Living Oceanside, LLC
Ocean Hills Phase II Development
4500 Cannon Rd.
Oceanside, CA
EEI Project No. AAA-72646.4
Created October 2018

EEI Engineering Solutions

FIGURE 3

APPENDIX A
SOIL CLASSIFICATION CHART AND BORING LOGS

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-98)

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LESS THAN 5% PASSING #200 Sieve)		GW	WELL-GRADED GRAVELS, GRAVEL- SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES
	GREATER THAN 50% OF COARSE FRACTION PASSING NO. 4 SEIVE	GRAVELS WITH FINES (GREATER THAN 12% PASSING #200 Sieve)		GM	SILTY-GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY-GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS (LESS THAN 5% PASSING #200 Sieve)		SW	WELL-GRADED SANDS,GRAVELLY-SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY-SANDS, LITTLE OR NO FINES
	GREATER THAN 50% OF COARSE FRACTION PASSING NO. 4 SEIVE	SANDS WITH FINES (GREATER THAN 12% PASSING #200 Sieve)		SM	SILTY-SANDS
				SC	CLAYEY-SANDS
FINE GRAINED SOILS	SILTS AND CLAYS	Low Plasticity (LIQUID LIMIT LESS THAN 50)		ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC CLAYS WITH LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	High Plasticity (LIQUID LIMIT GREATER THAN 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR VOCANIC ASH
				CH	INORGANIC CLAYS WITH HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS

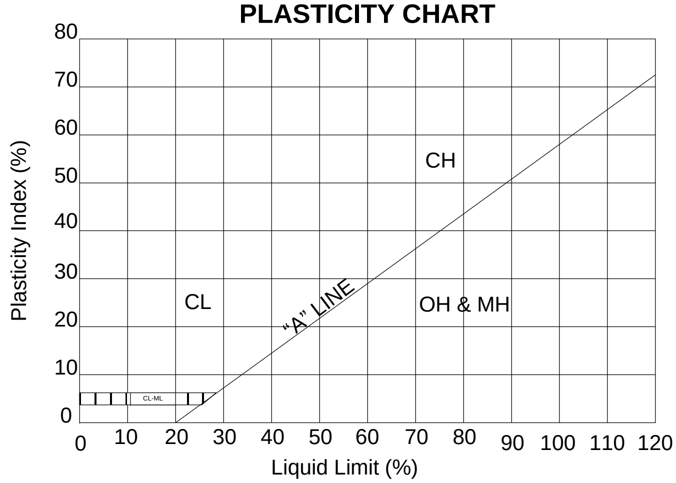
SAMPLER TYPES

- SPT
- Modified California (2.5" I.D.)
- Bulk
- Rock Core
- Shelby Tube
- Water Level

OTHER TESTS

ATT – Atterberg Limit (Plasticity Index)
CD – Consolidated Drained Triaxial
CON – Consolidation
COR – Corrosivity
DS – Direct Shear
EI – Expansion Index
MAX – Maximum Density
RV – R-Value
SA – Sieve Analysis
-#200 - Percent Passing #200 Sieve
TV – Torvane Shear
UU – Unconsolidated Undrained Triaxial

PLASTICITY CHART



PENETRATION RESISTANCE (Recorded As Blows/Foot)					
SAND & GRAVEL		SILT & CLAY			
Relative Density	Blows/Foot* N_{60}	Consistency	Blows/Foot* N_{60}	Strength**(KSF)
Very Loose	0-4	Very Soft	0 - 2	0 – 0.5
Loose	4-10	Soft	2 - 4	0.5 – 1.0
Medium Dense	10-30	Medium Stiff	4 - 8	1.0 – 2.0
Dense	30-50	Stiff	8 - 15	2.0 – 4.0
Very Dense	Over 50	Very Stiff	15 - 30	4.0 – 8.0
		Hard	Over 30	Over 8.0

* Number of blows of 140LB hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split barrel sampler the last 12 inches of an 18-inch drive (ASTM-1586 Standard Penetration Test)

** Undrained shear strength in kips/sq. ft. As determined by laboratory testing or approximated by the standard penetration test, pocket penetrometer, torvane, or visual observation

EEI
Geotechnical & Environmental Solutions

LEGEND TO SOIL DESCRIPTIONS

APPENDIX A

BORING NUMBER B-1/P-1

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 386 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0		**ARTIFICIAL FILL (Af)** Sandy Gravelly CLAY and Clayey SAND, light reddish-brown, damp, very dense/very stiff	SC	BULK								
3				MC	50 for 5"			12	101			
5				MC	50 for 3"			6	95			
6		**BEDROCK** @ 6' Decomposed GRANITE (Kg), excavates to Clayey SAND, reddish-brown mottled, oxidized, damp, very dense	SC									
7.5				MC	50 for 5"			5	129			
10		@ 10' No recovery		NR	50 for 2"							
15		@ 15' No recovery; refusal		NR	50 for 2"							

Total depth due to refusal: 15.1'
No groundwater encountered
Percolation test performed
Backfilled with bentonite and native soil

BORING NUMBER B-2

CLIENT Protea Senior Living Oceanside, LLC

PROJECT NAME Ocean Hills Phase 2

PROJECT NUMBER AAA-72646.4

PROJECT LOCATION 4500 Cannon Road, Oceanside CA

DATE STARTED 10/9/18 **COMPLETED** 10/9/18

GROUND ELEVATION 386 feet **BORING DIAMETER** 8"

EQUIPMENT / RIG Truck Mounted CME-55

HAMMER EFFICIENCY (%) 60

METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer

SPT CORRECTION 1.00 **CAL CORRECTION** 0.55

LOGGED BY MC **CHECKED BY** JPB

GROUNDWATER DEPTH (ft) Not Encountered

NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0 1 2 3		**ARTIFICIAL FILL (Af)** Clayey SAND, tan, medium dense, damp	SC									
4 5 6 7 8 9		**BEDROCK** @ 4' Decomposed GRANITE (Kg), excavates to Sandy CLAY to Clayey SAND, reddish brown, oxidized, damp, dense @ 9' Refusal	SC-CL									

Total depth: 9'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-3

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 386 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0 1 2 3		**ARTIFICIAL FILL (Af)** Clayey SAND, tan, medium dense, damp	SC-SM									
4 5 6		**BEDROCK** @ 4' Decomposed GRANITE (Kg), excavates to Sandy CLAY, reddish brown, oxidized, damp, very stiff @ 6' Refusal	CL									

Total depth: 6'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-4/P-2

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 386 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–4.5		**ARTIFICIAL FILL (Af)** Silty SAND, tan to light brown, damp, dense, common <2" gravel, trace clay	SM									
4.5–9		**BEDROCK** @ 4.5' Decomposed GRANITE (Kg), excavates to Silty Clayey SAND, reddish brown, oxidized, damp, very dense	SC									
9		@ 9' Refusal		SPT	50 for 2"			14				

Total depth due to refusal: 9'
Percolation test performed
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-5

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 387 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0		**ARTIFICIAL FILL (Af)** GRAVEL, damp, dense, temporary road	GP									
1–3		@ 0.5' Silty Gravelly SAND, reddish brown, damp, very dense	SM	BULK / MC	40 / 50 for 2"			7	122			
4–6		**BEDROCK** @ 4' Decomposed GRANITE (Kg), excavates to Clayey SAND and Sandy CLAY, reddish-brown mottled, oxidized, damp, very dense	SC	MC	50 for 5"			8	114			
7–8		@ 7.5' No Recovery @ 8' Refusal		NR	50 for 1"							

Total depth due to refusal: 8'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-6

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 386 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–5		**ARTIFICIAL FILL (Af)** Silty SAND, tan to reddish brown, damp, medium dense	SM	BULK								
2.5				MC	15 20 26	25		17	108			
5–7		@ 5' Sandy GRAVEL, reddish brown, damp, dense, common <1" dacite and granitic fragments	GM	MC	43 23 34	31		11	110			
7–9		**ALLUVIUM (Qal)** @ 7' Sandy SILT, dark brown to black, damp, stiff, trace clay, common roots, trace gravel	ML	MC	17 20 36	31		17	113			
9–16		**BEDROCK** @ 9' Decomposed GRANITICS (Kg), excavates to Clayey SAND, reddish brown, oxidized, damp, very dense	SC	MC	24 17 33	28		10	130			
15		@ 16' Refusal		SPT	50 for 3"			7				

Total depth due to refusal: 16'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-7

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 388 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–6		**ARTIFICIAL FILL (Af)** Silty SAND, tan to reddish brown, damp, medium dense, trace gravel	SM	MC	6 17 32	27		18	107			
				MC	13 50 for 2"			22	99			
6–9.5		@ 6' Sandy CLAY, reddish brown, damp, very stiff, common <1" dacite and granitic fragments	SC	MC	50 for 2"			17	131			
								13				
9.5–11		**SANTIAGO FORMATION (Ts)** @ 9.5' excavates to Clayey SAND to Silty SAND, reddish brown, oxidized, damp, very dense/stiff @ 11' Refusal on possible granitic rock	CL-ML	SPT	23 18 19	37						

Total depth due to refusal: 11'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-8

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 390 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–5		**ARTIFICIAL FILL (Af)** Silty SAND, tan to reddish brown, damp, medium dense, trace gravel, trace clay	SM	BULK / MC	8 12 19	17		12	118			
5–7		@ 5' Gravelly SAND, reddish brown, damp, dense, common <1" dacite and granitic fragments, trace clay	GM	MC	15 17 18	19		5	120			
7–10		@ 7' Gravelly Silty CLAY, olive to reddish brown, damp, stiff to very stiff	GC	MC	13 18 20	21		15	116			
10–15		**BEDROCK** @ 10' Decomposed GRANITICS (Kg), excavates to Clayey SAND, reddish brown, oxidized, damp, very dense	SC	MC	50 for 4"			8	103			
		@ 15' Refusal		SPT	39 32 23	55		7				

Total depth due to refusal: 15'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-9

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 390 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0 – 2		**ARTIFICIAL FILL (Af)** Silty SAND, tan to reddish brown, damp, medium dense, trace gravel, trace clay	SM									
2 – 7		@ 2' Sandy Clayey SILT to Silty CLAY, damp stiff, common <1" dacite and granitic fragments, trace sand	CL-ML	BULK								
2.5 – 4				MC	9 13 21	19		18	106			
5 – 6.5				MC	13 17 22	21		15	116			
7 – 11		@ 7' Silty SAND, tan to reddish brown, damp, very dense, trace clay	SM									
7.5 – 8.5				MC	50 for 12"			8	121			
10		@ 10' No recovery; gravel?		NR	50 for 4"							
11 – 13		**ALLUVIUM** @ 11' Clayey SAND, reddish brown to grayish-brown, damp, very dense, common <2" granitic and siltstone fragments	SC									
13 – 17.5		**SANTIAGO FORMATION (Ts)** @ 13' excavates to CLAY, olive to reddish brown, oxidized, damp, stiff to very stiff, trace gypsum	CL					20				
15 – 16.5				SPT	5 8 12	20						
17.5		@ 17.5' Refusal on possible granitic rock										

Total depth due to refusal: 17.5'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-10

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 391 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–2		**ARTIFICIAL FILL** Silty Gravelly SAND, light brown, medium dense, damp, trace clay, common <1" gravel	SM									
2–6		@ 2' Silty SAND, tan white mottled, damp, dense	SM									
2–3				MC	16 35 45	44		12	119			
5–6				MC	12 25 35	33		20	117			
6–8		@ 6' Silty CLAY, tan to olive brown to brown, some orange oxidation streaks, slightly moist, very stiff, common <2" sandstone and granitic fragments	CL-ML					14				
7–8				SPT	41 21 23	44						
8		@ 8' Refusal on possible granitic rock										

Total depth due to refusal: 8'
No groundwater encountered
Backfilled with bentonite and native soil

GEOTECH LOG - COLUMNS AAA-72646.4.GPJ GINT STD US LAB.GDT 10/25/18

BORING NUMBER B-11

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 390 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–1		**ARTIFICIAL FILL** Silty Gravelly SAND, light brown, damp, medium dense, common roots	SM									
1–4		@ 1' Clayey SILT, tan to brown to olive brown, slightly moist, very stiff, common <4" fragments of sandstone, granitics, and dacite	CL-ML	BULK MC	15 35 45	44		17	115			RV
4–7		@ 4' Silty Gravelly CLAY, brown to olive brown, slightly moist, very stiff, common <2" granitic, sandstone, and dacite fragments	GC	MC	6 25 30	30		18	108			
7–9		**ALLUVIUM** @ 7' Sandy SILT, dark reddish brown to black, damp, very dense, trace clay, common roots and artificial detritus	ML	MC	19 35 40	41		10	127			
9–10.5		**BEDROCK** @ 9' Decomposed GRANITE, excavates to Clayey SAND, reddish brown mottled, damp, very dense @ 10.5' Refusal	SC	MC	50 for 5"			6	141			

Total depth due to refusal: 10.5'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-12

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC
PROJECT NAME Ocean Hills Phase 2
PROJECT NUMBER AAA-72646.4
PROJECT LOCATION 4500 Cannon Road, Oceanside CA
DATE STARTED 10/9/18 **COMPLETED** 10/9/18
GROUND ELEVATION 388 feet **BORING DIAMETER** 8"
EQUIPMENT / RIG Truck Mounted CME-55
HAMMER EFFICIENCY (%) 60
METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer
SPT CORRECTION 1.00 **CAL CORRECTION** 0.55
LOGGED BY MC **CHECKED BY** JPB
GROUNDWATER DEPTH (ft) Not Encountered
NOTES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–5.5		**ARTIFICIAL FILL** Silty Gravelly SAND, light brown to tan, damp, medium dense, common roots, common <5" fragments of sandstone	SM	MC	21 34 46	44		12	115			
5				MC	10 30 50 for 3"			9	112			
5.5–10		@ 5.5' Sandy Gravelly CLAY, tan to grayish-brown to olive-brown, slightly moist, very stiff to hard, common <2" granitic, sandstone, and dacite fragments	GC	MC	50 for 6"			10	92			
10–13		**ALLUVIUM** @ 10' Sandy GRAVEL and Gravelly SAND, reddish brown to dark brown, damp, very dense, common <3" granitic and dacite fragments, trace clay	GM	MC	50 for 6"			10	109			
12				SPT	30 50 for 3"			10				
13		@ 13' Refusal; possible granitic contact										

Total depth due to refusal: 13'
No groundwater encountered
Backfilled with bentonite and native soil

BORING NUMBER B-13

EEI Engineering Solutions

CLIENT Protea Senior Living Oceanside, LLC

PROJECT NAME Ocean Hills Phase 2

PROJECT NUMBER AAA-72646.4

PROJECT LOCATION 4500 Cannon Road, Oceanside CA

DATE STARTED 10/9/18 **COMPLETED** 10/9/18

GROUND ELEVATION 390 feet **BORING DIAMETER** 8"

EQUIPMENT / RIG Truck Mounted CME-55

HAMMER EFFICIENCY (%) 60

METHOD 8" Hollow Stem Auger 140 lbs Auto Hammer

SPT CORRECTION 1.00 **CAL CORRECTION** 0.55

LOGGED BY MC **CHECKED BY** JPB

GROUNDWATER DEPTH (ft) Not Encountered

NOTES

DEPTH (ft)	MATERIAL DESCRIPTION	USCS SYMBOL	SAMPLE TYPE	PENETRATION RESISTANCE (blows/6-inches)	SPT N60	POCKET PEN (tsf)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	ATTERBERG LIMITS (PI:LL)	FINES CONTENT (%)	OTHER TESTS
0–1.5	**ARTIFICIAL FILL** Silty Gravelly SAND, light brown to tan, damp, medium dense, common roots, common <5" fragments of sandstone	SM									
1.5–7	@ 1.5' Silty CLAY and Sandy SILT, olvie to white mottled to tan, very stiff, slightly moist	CL-ML	BULK								EI DS COR MAX
2.5			MC	22 50 for 5"			16	114			
5			MC	15 29 36	36		27	101			
7–9.5	@ 7' Sandy SILT, tan to brown, damp, very stiff to hard	MLS	MC	50 for 4"			9	22			
9.5–13	**ALLUVIUM** @ 9.5' Clayey Silty SAND, black to dark brown, orange-red oxidation, damp, very dense, some plant roots, possible topsoil or alluvium	SC	MC	50 for 5"			11	93			
13–15	@ 13' Clayey SAND, reddish brown, very dense, damp, decomposed granite?	SC									
15	@ 15' No recovery; refusal on possible granitic rock		NR	50 for 2"							

Total depth due to refusal: 15.1'
No groundwater encountered
Backfilled with bentonite and native soil

APPENDIX B
LABORATORY TEST DATA

Laboratory tests were performed to provide geotechnical parameters for engineering analyses. The following tests were performed:

- **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System.
- **MOISTURE CONTENT and DRY DENSITY:** The in-situ moisture content and dry density of soils was determined for soil samples obtained from the borings, and were determined in general accordance with ASTM D2216 and ASTM 2937, respectively.
- **GRAIN SIZE DISTRIBUTION:** The grain size distribution was determined on select samples in accordance with ASTM D422.
- **ATTERBERG LIMITS**: The Atterberg limits were determined on select samples in accordance with ASTM D4318.
- **EXPANSION INDEX:** The expansion index was determined on select samples in accordance with ASTM D4829.
- **CORROSIVITY**: Corrosion testing of representative soil samples included sulfate potential by California Test 417, chloride potential by California Test 422, and soil minimum resistivity and pH by California Test 643. The sample was tested at the Clarkson Laboratory and Supply, Inc. located in Chula Vista, California.

EXPANSION INDEX TEST

ASTM METHOD D4829

B-13 @ 0-5 ft.

Moisture Content of Initial Sample		% Saturation of Re-molded Sample		Moisture Content of Final Sample	
Tare No. -	55	Wt. of Soil and Ring (g) -	610.2	Wt. of Soil and Ring (g) -	640.5
Wet Weight and Tare (g) -	161.5	Ring Weight (g) -	198.6	Ring Weight (g) -	198.6
Dry Weight and Tare (g) -	152.7	Wet Weight of Soil (g) -	411.6	Wet Weight of Soil (g) -	441.9
Tare Weight (g) -	50.1	Dry Weight of Soil (g) -	379.1	Dry Weight of Soil (g) -	379.1
Water Loss (g) -	8.8	Volume of Ring (ft^3) -	0.0073	Weight of Water (g) -	62.8
Dry Weight (g) -	102.6	Dry Density (pcf) -	114.5	Final Moisture (%)	16.6
Initial Moisture (%) -	8.6	Initital Saturation (%) -	49.1	Final Saturation (%) -	94.9

Expansion Test - UBC (144 PSF)				
	Date	Time	Reading	
Add Weight	10/18/18	10:40	0.000	
10 Minutes		10:50	0.000	Initial Reading
Add Water		11:40	0.040	
		1:12	0.041	
	10/19/18	5:50	0.043	Final Reading

EImeasured	=	43
EI_{50}	=	42

Expansion Index, EI_{50}	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

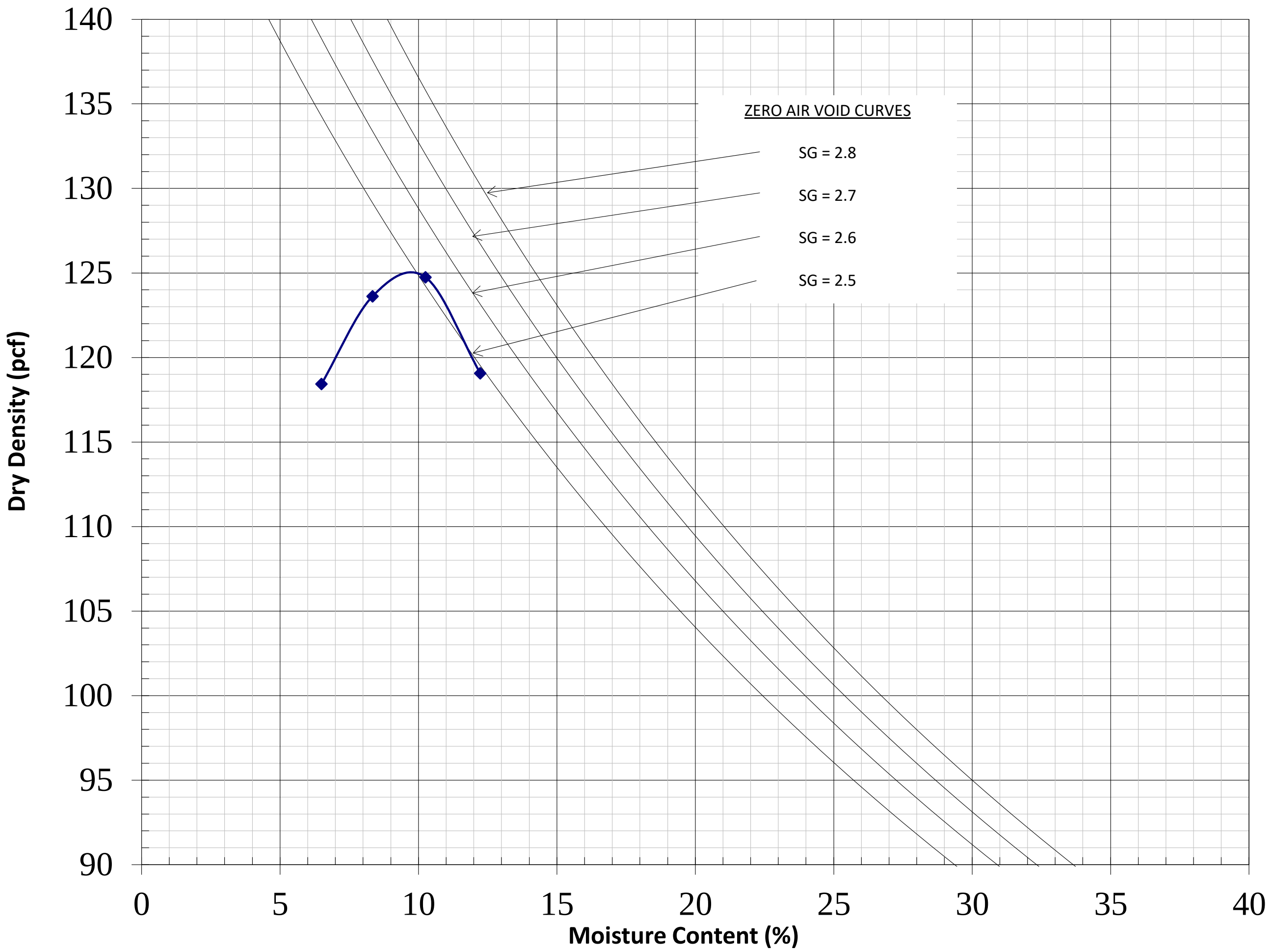
EEI
Engineering Solutions

2195 Faraday Avenue, Suite K, Carlsbad, CA 92008

Client:	Portola
Project Name:	Parcel #2
Project No.:	AAA-72646.4
Date:	10/18/2018
Boring/Sample No.:	B-13
Depth/Location:	0-5 ft.
Soil Description:	Grey-Brn. Sandy Silt SM
Tested By:	B D

LABORATORY COMPACTION ASTM D 1557

Sample	1	2	3	4
Mold and Wet Soil (lbs.)	8.48	8.74	8.86	8.73
Small Mold (lbs.)	4.28	4.28	4.28	4.28
Wet Soil (lbs.)	4.20	4.46	4.58	4.45
Wet Density (pcf)	126.1	133.9	137.5	133.6
Tare and Wet Soil (gm.)	100.00	100.00	100.00	100.00
Tare and Dry Soil (gm.)	93.90	92.30	90.70	89.10
Moisture (%)	**6.5**	**8.3**	**10.3**	**12.2**
Dry Density (pcf)	**118.4**	**123.6**	**124.7**	**119.1**



Maximum Density 125.5 pcf @ 9.5 % Moisture

2195 Faraday, Suite K, Carlsbad, CA 92008

Client:	Protea Senior Living-Oceanside,LLC
Project Name:	Parcel #2
Project Number:	AAA-72646.4
Date:	10/17/2018
Procedure:	D-1557-A
Boring/Sample No.:	B-13
Depth/Location:	0-5 ft.
Soil Description:	Brown Silty Sand SM
Tested By:	B D

DIRECT SHEAR TEST (ASTM D3080)

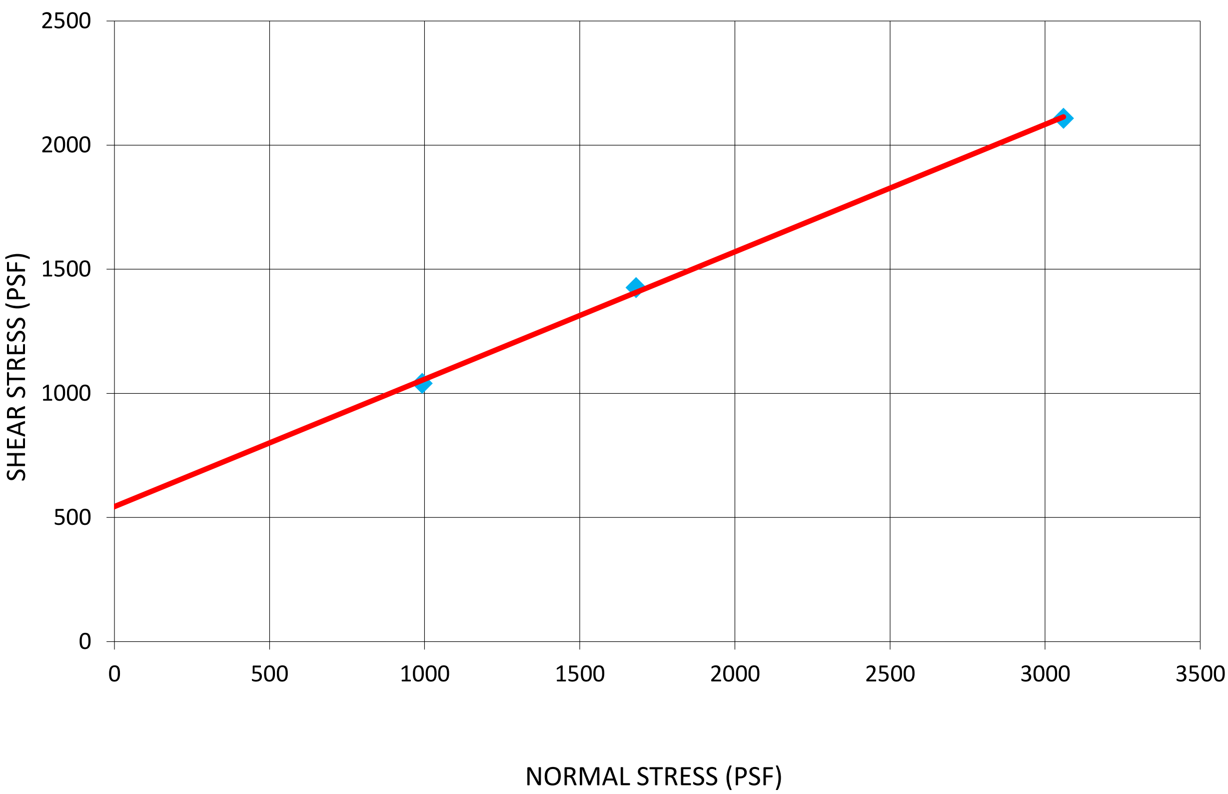
B-13	@	0-5 ft

Sample Data	
Remolded:	90%
Remarks:	Sample inundated prior to testing
Soil Description:	Grey-Brn. Sandy Silt ML

Test Results		
Average Initial Moisture =	9.5	%
Average Dry Density =	112.9	pcf
Average Final Moisture =	17.1	%

Peak Strength	ϕ = 27 deg.	c = 544 psf

SHEAR TEST DIAGRAM



EEI Engineering Solutions

2195 Faraday Avenue, Suite K, Carlsbad, CA 92008

Client:	Protea Senior Living-Oceanside,LLC
Project Name:	Parcel #2
Project No.:	AAA-72646.4
Date:	10/18/18
Boring/Sample No:	B-13
Depth/Location:	0-5 ft
Soil Description:	Grey-Brn. Sandy Silt ML
Tested by:	B D

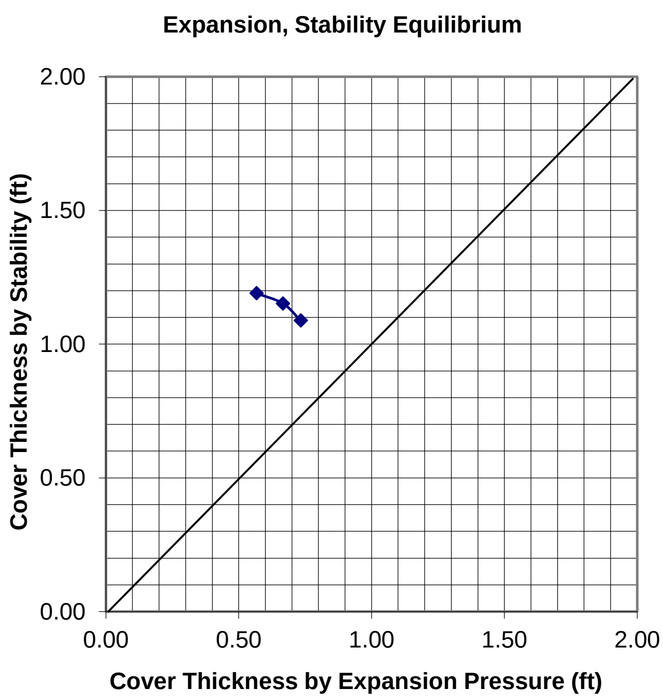
TEST SPECIMEN		A	B	C	D
Compactor air pressure	**PSI**	160	110	70	
Water added	**%**	3.6	4.8	7.0	
Moisture at compaction	**%**	15.8	17.0	19.2	
Height of sample	**IN**	2.52	2.67	2.6	
Dry density	**PCF**	113.6	109.0	106.4	
R-Value by exudation		15	10	7	
R-Value by exudation, corrected		15	10	7	
Exudation pressure	**PSI**	449	340	183	
Stability thickness	**FT**	1.09	1.15	1.19	
Expansion pressure thickness	**FT**	0.73	0.67	0.57	

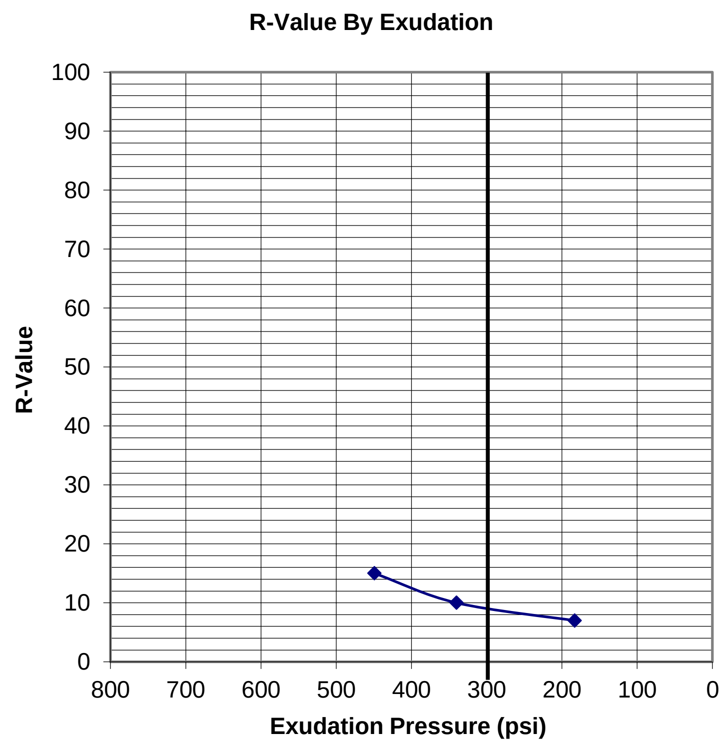
DESIGN CALCULATION DATA

Traffic index, assumed	5.0
Gravel equivalent factor, assumed	1.25
Expansion, stability equilibrium	
R-Value by expansion	NA
R-Value by exudation	9
R-Value at equilibrium	**9**

SAMPLE INFORMATION

Sample Location: B-11, 0-5ft
Sample Description: Light Olive Brown Sandy Clay
Notes: AAA-72646.4
0% Retained on 3/4 inch sieve
Test Method: Cal-Trans Test 301





GeoSoils, Inc.
5741 Palmer Way
Carlsbad, CA 92008
Telephone: (760) 438-3155
Fax: (760) 931-0915

9/2/2010

R - VALUE TEST RESULTS

Project: EEI Tiger
Number: 5932-E-SC
Date: October 2018 Plate: 1

L A B O R A T O R Y   R E P O R T

Telephone (619) 425-1993   Fax 425-7917   Established 1928

C L A R K S O N   L A B O R A T O R Y   A N D   S U P P L Y   I N C.
350 Trousdale Dr. Chula Vista, Ca. 91910 www.clarksonlab.com
A N A L Y T I C A L   A N D   C O N S U L T I N G   C H E M I S T S

Date: October 16, 2018
Purchase Order Number: AAA-72646-4
Sales Order Number: 41926
Account Number: EEI

To:

EEI Environmental Equalizers Inc
2195 Faraday Avenue Suite K
Carlsbad, CA 92008
Attention: Jeff Blake

Laboratory Number: SO7060   Customers Phone: 760-431-3747

Sample Designation:

One soil sample received on 10/12/18 at 3:45pm,
taken from Parcel #2 Project#AAA-72646-4
marked as B-13@0'-5'.

Analysis By California Test 643, 1999, Department of Transportation Division of Construction, Method for Estimating the Service Life of Steel Culverts.

pH 7.0

Water Added (ml)	Resistivity (ohm-cm)
10	1700
5	1000
5	710
5	550
5	520
5	540
5	570

17 years to perforation for a 16 gauge metal culvert.
22 years to perforation for a 14 gauge metal culvert.
30 years to perforation for a 12 gauge metal culvert.
38 years to perforation for a 10 gauge metal culvert.
47 years to perforation for a 8 gauge metal culvert.

Water Soluble Sulfate Calif. Test 417   0.025% (250ppm)

Water Soluble Chloride Calif. Test 422   0.026% (260ppm)

Laura Torres

Laura Torres
LT/ilv

APPENDIX C
FORM I 8

Categorization of Infiltration Feasibility Condition		Form I-8	
Part 1 - Full Infiltration Feasibility Screening Criteria **Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: Based on our percolation testing at the site, the calculated Infiltration Rate at both test borings is 0.11 in/hr with a factor of safety of 2.0 applied. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: Measured infiltration rates are less than 0.5 in/hr (see Criteria 1). Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Form I-8 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Measured infiltration rates are less than 0.5 in/hr (see Criteria 1). Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Measured infiltration rates are less than 0.5 in/hr (see Criteria 1). Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result *	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		No, Full Infiltration is not considered to be feasible

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

Form I-8 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

Percolation testing was conducted within two borings at depths of approximately 15 and 9 feet below existing ground surface. Tests were run at intervals of 30 minutes for each boring, and the resulting percolation rate was converted to an infiltration rate using the Porchet Method. A factor of safety of 2.0 was applied to the calculated infiltration rate, per the City of Oceanside/County of San Diego BMP guidelines. The measured infiltration rate at both borings is 0.11 in/hr.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Criteria	Screening Question	Yes	No
6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis:

Percolation testing was conducted within decomposed granitic bedrock, which has the consistency of sandy clay and clayey sand, and is the reason for the low infiltration rates. While the measured infiltration could technically allow for partial infiltration at the site, they could also pose a hazard to utilities for the proposed development.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Form I-8 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Groundwater was not encountered during our subsurface investigation to the maximum depth of 17.5 feet below ground surface. There are no known contaminants onsite. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		
Provide basis: This question requires the expertise of water-rights lawyers to determine if any violation can be expected downstream by reducing the run-off slightly via infiltration of the water into bioretention or stormwater devices Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	Partial Infiltration may be feasible	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

APPENDIX D
EARTHWORK AND GRADING GUIDELINES

EARTHWORK AND GRADING GUIDELINES

GENERAL

These guidelines present general procedures and recommendations for earthwork and grading as required on the approved grading plans, including preparation of areas to be filled, placement of fill and installation of subdrains and excavations. The recommendations contained in the geotechnical report are applicable to each specific project, are part of the earthwork and grading guidelines and would supersede the provisions contained hereafter in the case of conflict. Observations and/or testing performed by the consultant during the course of grading may result in revised recommendations which could supersede these guidelines or the recommendations contained in the geotechnical report. Figures A through O is provided at the back of this appendix, exhibiting generalized cross sections relating to these guidelines.

The contractor is responsible for the satisfactory completion of all earthworks in accordance with provisions of the project plans and specifications. The project soil engineer and engineering geologist (geotechnical consultant) or their representatives should provide observation and testing services, and geotechnical consultation throughout the duration of the project.

EARTHWORK OBSERVATIONS AND TESTING

Geotechnical Consultant

Prior to the commencement of grading, a qualified geotechnical consultant (a soil engineer and engineering geologist) should be employed for the purpose of observing earthwork procedures and testing the fills for conformance with the recommendations of the geotechnical report, the approved grading plans, and applicable grading codes and ordinances.

The geotechnical consultant should provide testing and observation so that determination may be made that the work is being completed as specified. It is the responsibility of the contractor to assist the consultant and keep them aware of work schedules and predicted changes, so that the consultant may schedule their personnel accordingly.

All removals, prepared ground to receive fill, key excavations, and subdrains should be observed and documented by the project engineering geologist and/or soil engineer prior to placing any fill. It is the contractor's responsibility to notify the engineering geologist and soil engineer when such areas are ready for observation.

Laboratory and Field Tests

Maximum dry density tests to determine the degree of compaction should be performed in accordance with American Standard Testing Materials test method ASTM designation D-1557-78. Random field compaction tests should be performed in accordance with test method ASTM designations D-1556-82, D-2937 or D-2922 & D-3017, at intervals of approximately two feet of fill height per 10,000 sq. ft. or every one thousand cubic yards of fill placed. These criteria would vary depending on the soil conditions and the size of the project. The location and frequency of testing would be at the discretion of the geotechnical consultant

Contractor's Responsibility

All clearing, site preparation, and earthwork performed on the project should be conducted by the contractor, with observation by geotechnical consultants and staged approval by the appropriate governing agencies. It is the contractor's responsibility to prepare the ground surface to receive the fill to the satisfaction of the soil engineer, and to place, spread, moisture condition, mix and compact the fill in accordance with the recommendations of the soil engineer. The contractor should also remove all major deleterious material considered unsatisfactory by the soil engineer.

It is the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the earthwork in accordance with applicable grading guidelines, codes or agency ordinances, and approved grading plans. Sufficient watering apparatus and compaction equipment should be provided by the contractor with due consideration for the fill material, rate of placement, and climatic conditions. If, in the opinion of the geotechnical consultant, unsatisfactory conditions such as questionable weather, excessive oversized rock, deleterious material or insufficient support equipment are resulting in a quality of work that is not acceptable, the consultant will inform the contractor, and the contractor is expected to rectify the conditions, and if necessary, stop work until conditions are satisfactory.

The contractor will properly grade all surfaces to maintain good drainage and prevent ponding of water. The contractor will take action to control surface water and to prevent erosion control measures that have been installed.

SITE PREPARATION

All vegetation including brush, trees, thick grasses, organic debris, and other deleterious material should be removed and disposed of offsite, and must be concluded prior to placing fill. Existing fill, soil, alluvium, colluvium, or rock materials determined by the soil engineer or engineering geologist as unsuitable for structural in-place support should be removed prior to fill placement. Depending upon the soil conditions, these materials may be reused as compacted fills. Any materials incorporated as part of the compacted fills should be approved by the soil engineer.

Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipelines, or other structures not located prior to grading are to be removed or treated in a manner recommended by the soil engineer. Soft, dry, spongy, highly fractured, or otherwise unsuitable ground extending to such a depth that surface processing cannot adequately improve the condition should be over excavated down to firm ground and approved by the soil engineer before compaction and filling operations continue. Over excavated and processed soils which have been properly mixed and moisture-conditioned should be recompacted to the minimum relative compaction as specified in these guidelines.

Existing ground which is determined to be satisfactory for support of the fills should be scarified to a minimum depth of 6 inches, or as directed by the soil engineer. After the scarified ground is brought to optimum moisture (or greater) and mixed, the materials should be compacted as specified herein. If the scarified zone is greater than 6 inches in depth, it may be necessary to remove the excess and place the material in lifts restricted to 6 inches in compacted thickness.

Existing grind which is not satisfactory to support compacted fill should be over excavated as required in the geotechnical report or by the onsite soils engineer and/or engineering geologists. Scarification, discing, or other acceptable form of mixing should continue until the soils are broken down and free of large fragments or clods, until the working surface is reasonably uniform and free from ruts, hollows, hummocks, or other uneven features which would inhibit compaction as described above.

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical) gradient, the ground should be benched. The lowest bench, which will act as a key, should be a minimum of 12 feet wide and should be at least two feet deep into competent material, approved by the soil engineer and/or engineering geologist. In fill over cut slope conditions, the recommended minimum width of the lowest bench or key is at least 15 feet with the key excavated on competent material, as designated by the Geotechnical Consultant. As a general rule, unless superseded by the Soil Engineer, the minimum width of fill keys should be approximately equal to one-half (½) the height of the slope.

Standard benching is typically four feet (minimum) vertically, exposing competent material. Benching may be used to remove unsuitable materials, although it is understood that the vertical height of the bench may exceed four feet. Pre stripping may be considered for removal of unsuitable materials in excess of four feet in thickness.

All areas to receive fill, including processed areas, removal areas, and toe of fill benches should be observed and approved by the soil engineer and/or engineering geologist prior to placement of fill. Fills may then be properly placed and compacted until design grades are attained.

COMPACTED FILLS

Earth materials imported or excavated on the property may be utilized as fill provided that each soil type has been accepted by the soil engineer. These materials should be free of roots, tree branches, other organic matter or other deleterious materials. All unsuitable materials should be removed from the fill as directed by the soil engineer. Soils of poor gradation, undesirable expansion potential, or substandard strength characteristics may be designated unsuitable by the consultant and may require mixing with other earth materials to serve as a satisfactory fill material.

Fill materials generated from benching operations should be dispersed throughout the fill area. Benching operations should not result in the benched material being placed only within a single equipment width away from the fill/bedrock contact.

Oversized materials, defined as rock or other irreducible materials with a maximum size exceeding 12 inches in one dimension, should not be buried or placed in fills unless the location of materials and disposal methods are specifically approved by the soil engineer. Oversized material should be taken offsite or placed in accordance with recommendations of the soil engineer in areas designated as suitable for rock disposal. Oversized material should not be placed vertically within 10 feet of finish grade or horizontally within 20 feet of slope faces.

To facilitate trenching, rock should not be placed within the range of foundation excavations or future utilities unless specifically approved by the soil engineer and/or the representative developers.

If import fill material is required for grading, representative samples of the material should be analyzed in the laboratory by the soil engineer to determine its physical properties. If any material other than that previously analyzed is imported to the fill or encountered during grading, analysis of this material should be conducted by the soil engineer as soon as practical.

Fill material should be placed in areas prepared to receive fill in near-horizontal layers that should not exceed six inches compacted in thickness. The soil engineer may approve thicker lifts if testing indicates the grading procedures are such that adequate compaction is being achieved. Each layer should be spread evenly and mixed to attain uniformity of material and moisture suitable for compaction.

Fill materials at moisture content less than optimum should be watered and mixed, and “wet” fill materials should be aerated by scarification, or should be mixed with drier material. Moisture conditioning and mixing of fill materials should continue until the fill materials have uniform moisture content at or above optimum moisture.

After each layer has been evenly spread, moisture-conditioned and mixed, it should be uniformly compacted to a minimum of 90 percent of maximum density as determined by ASTM test designation, D 1557-78, or as otherwise recommended by the soil engineer. Compaction equipment should be adequately sized and should be reliable to efficiently achieve the required degree of compaction.

Where tests indicate that the density of any layer of fill, or portion thereof, is below the required relative compaction or improper moisture content, the particular layer or portion will be reworked until the required density and/or moisture content has been attained. No additional fill will be placed in an area until the last placed lift of fill has been tested and found to meet the density and moisture requirements, and is approved by the soil engineer.

Compaction of slopes should be accomplished by over-building the outside edge a minimum of three feet horizontally, and subsequently trimming back to the finish design slope configuration. Testing will be performed as the fill is horizontally placed to evaluate compaction as the fill core is being developed. Special efforts may be necessary to attain the specified compaction in the fill slope zone. Final slope shaping should be performed by trimming and removing loose materials with appropriate equipment. A final determination of fill slope compaction should be based on observation and/or testing of the finished slope face.

If an alternative to over-building and cutting back the compacted fill slope is selected, then additional efforts should be made to achieve the required compaction in the outer 10 feet of each lift of fill by undertaking the following:

- Equipment consisting of a heavy short-shanked sheepsfoot should be used to roll (horizontal) parallel to the slopes continuously as fill is placed. The sheepsfoot roller should also be used to roll perpendicular to the slopes, and extend out over the slope to provide adequate compaction to the face slope.

- Loose fill should not be spilled out over the face of the slope as each lift is compacted. Any loose fill spilled over a previously completed slope face should be trimmed off or be subject to re-rolling.

- Field compaction tests will be made in the outer two to five feet of the slope at two to three foot vertical intervals, subsequent to compaction operations.

- After completion of the slope, the slope face should be shaped with a small dozer and then re-rolled with a sheepsfoot to achieve compaction to near the slope face. Subsequent to testing to verify compaction, the slopes should be grid-rolled to achieve adequate compaction to the slope face. Final testing should be used to confirm compaction after grid rolling.

- Where testing indicates less than adequate compaction, the contractor will be responsible to process, moisture condition, mix and recompact the slope materials as necessary to achieve compaction. Additional testing should be performed to verify compaction.

- Erosion control and drainage devices should be designed by the project civil engineer in compliance with the ordinances of the controlling governmental agencies, and/or in accordance with the recommendations of the soil engineer or engineering geologist.

EXCAVATIONS

Excavations and cut slopes should be observed and mapped during grading by the engineering geologist. If directed by the engineering geologist, further excavations or over-excavation and refilling of cut areas should be performed. When fills over cut slopes are to be graded, the cut portion of the slope should be observed by the engineering geologist prior to placement of the overlying fill portion of the slope. The engineering geologist should observe all cut slopes and should be notified by the contractor when cut slopes are started.

If, during the course of grading, unanticipated adverse or potentially adverse geologic conditions are encountered, the engineering geologist and soil engineer should investigate, evaluate and make recommendations to mitigate (or limit) these conditions. The need for cut slope buttressing or stabilizing should be based on as-grading evaluations by the engineering geologist, whether anticipated previously or not.

Unless otherwise specified in soil and geological reports, no cut slopes should be excavated higher or steeper than that allowed by the ordinances of controlling governmental agencies. Additionally, short-term stability of temporary cut slopes is the contractor’s responsibility.

Erosion control and drainage devices should be designed by the project civil engineer and should be constructed in compliance with the ordinances of the controlling governmental agencies, and/or in accordance with the recommendations of the soil engineer or engineering geologist.

SUBDRAIN INSTALLATION

Subdrains should be installed in accordance with the approved embedment material, alignment and details indicated by the geotechnical consultant. Subdrain locations or construction materials should not be changed or modified without approval of the geotechnical consultant. The soil engineer and/or engineering geologist may recommend and direct changes in subdrain line, grade and drain material in the field, pending exposed conditions. The location of constructed subdrains should be recorded by the project civil engineer.

COMPLETION

Consultation, observation and testing by the geotechnical consultant should be completed during grading operations in order to state an opinion that all cut and filled areas are graded in accordance with the approved project specifications.

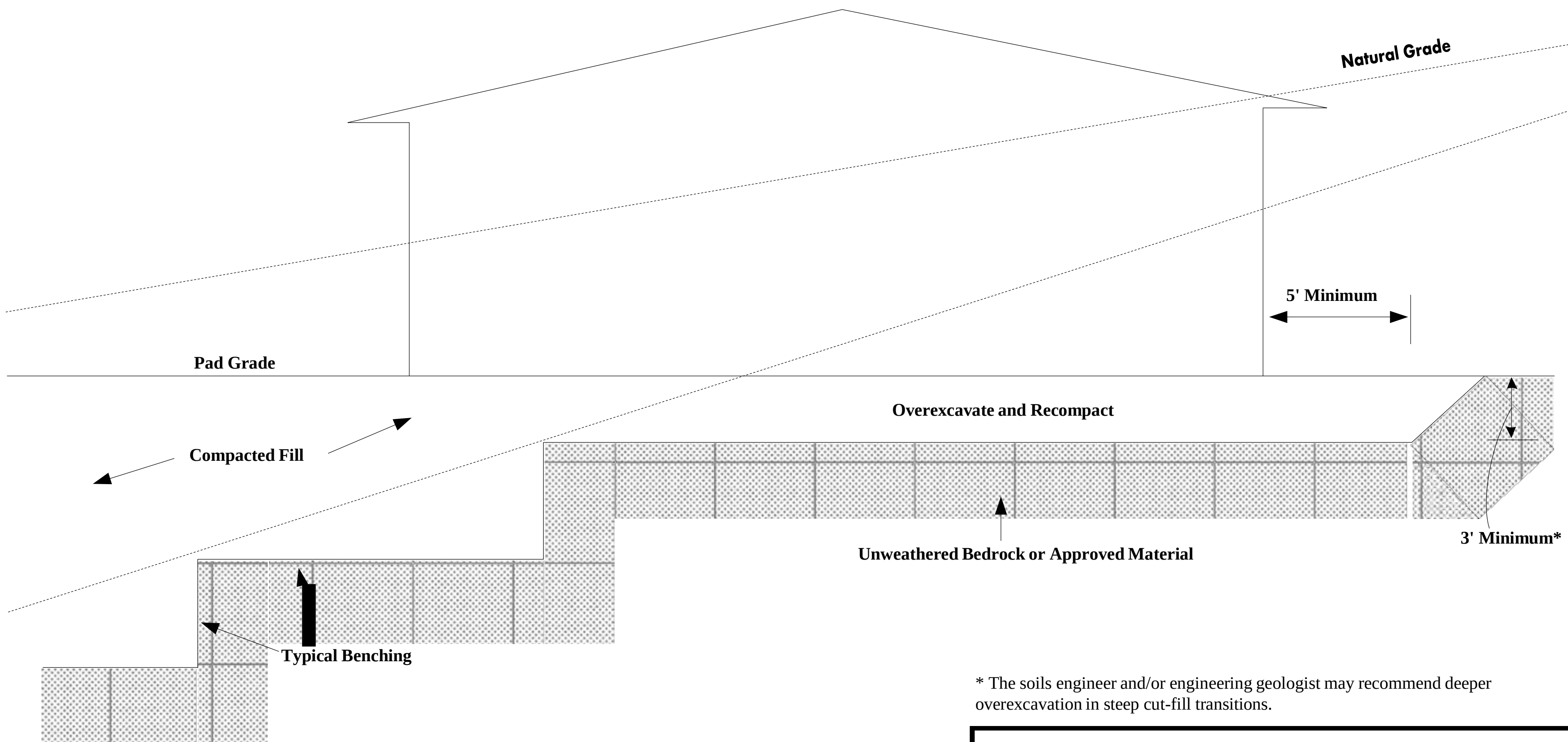
After completion of grading and after the soil engineer and engineering geologist have finished their observations, final reports should be submitted subject to review by the controlling governmental agencies. No additional grading should be undertaken without prior notification of the soil engineer and/or engineering geologist.

All finished cut and fill slopes should be protected from erosion, including but not limited to planting in accordance with the plan design specifications and/or as recommended by a landscape architect. Such protection and/or planning should be undertaken as soon as possible after completion of grading.

ATTACHMENTS

Figure A – Transition Lot Detail Cut Lot
Figure B – Transition Lot Detail Cut - Fill
Figure C – Rock Disposal Pits
Figure D – Detail for Fill Slope Toeing out on a Flat Alluviated Canyon
Figure E – Removal Adjacent to Existing Fill
Figure F – Daylight Cut Lot Detail
Figure G – Skin Fill of Natural Ground
Figure H – Typical Stabilization Buttress Fill Design
Figure I – Stabilization Fill for Unstable Material Exposed in Portion of Cut Slope
Figure J – Fill Over Cut Detail
Figure K – Fill Over Natural Detail
Figure L – Oversize Rock Disposal
Figure M – Canyon Subdrain Detail
Figure N – Canyon Subdrain Alternate Details
Figure O – Typical Stabilization Buttress Subdrain Detail
Figure P – Retaining Wall Backfill

TRANSITION LOT DETAIL
CUT LOT – MATERIAL TYPE
TRANSITION



* The soils engineer and/or engineering geologist may recommend deeper overexcavation in steep cut-fill transitions.

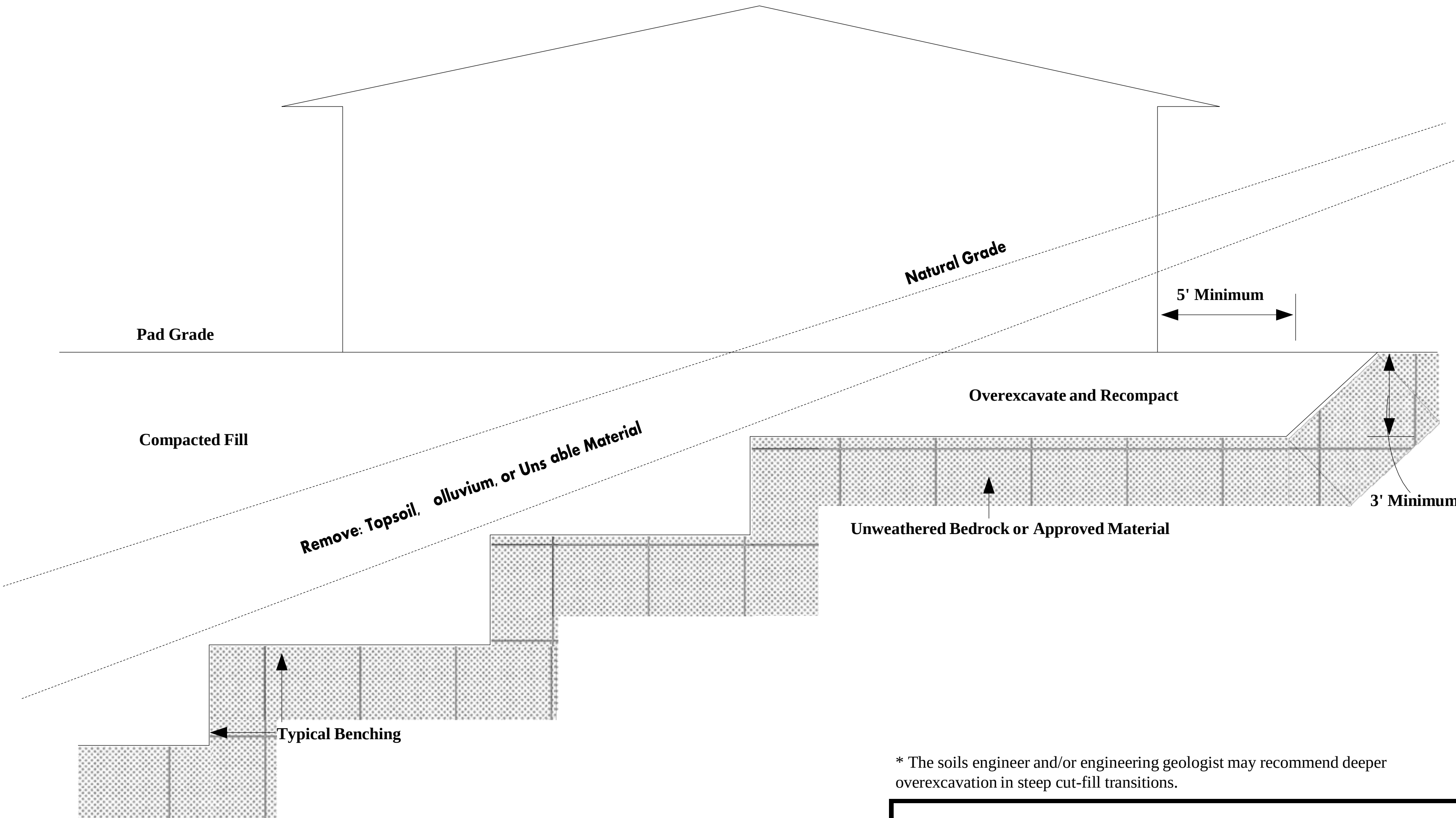
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
TRANSITION LOT DETAIL
CUT LOT – MATERIAL TYPE TRANSITION

EEI
Engineering Solutions

FIGURE A

TRANSITION LOT DETAIL
CUT – FILL – DAYLIGHT TRANSITION



* The soils engineer and/or engineering geologist may recommend deeper overexcavation in steep cut-fill transitions.

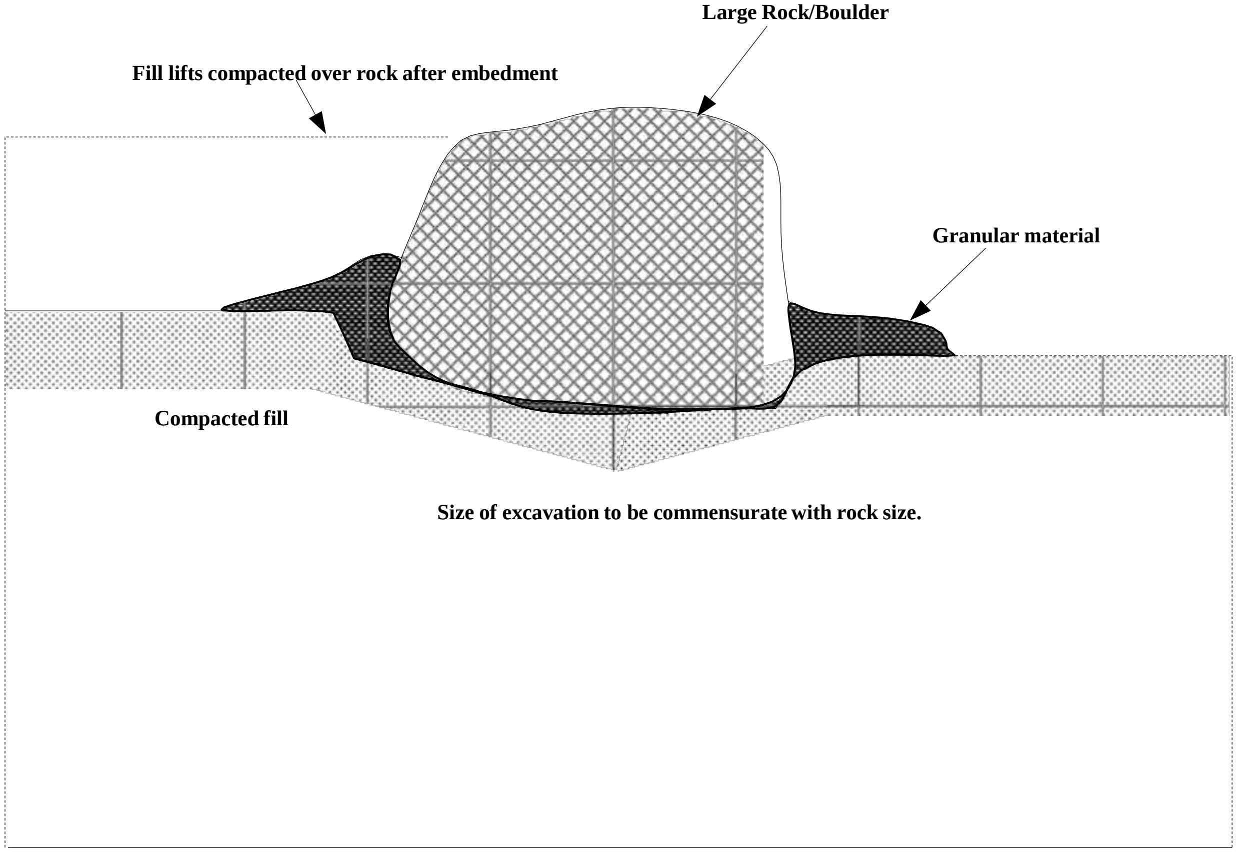
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
TRANSITION LOT DETAIL
CUT – FILL – DAYLIGHT TRANSITION

EEI
Engineering Solutions

FIGURE B

ROCK DISPOSAL PITS



Note:
(1) Large rock is defined as having a diameter larger than 3 feet in maximum size.
(2) Pit shall be excavated into compacted fill to a depth equal to half of the rock size.
(3) Granular soil shall be pushed into the pit and then flooded around the rock using a sheepsfoot to help with compaction.
(4) A minimum of 3 feet of compacted fill should be laid over each pit.
(5) Pits shall have at least 15 feet of separation between one another, horizontally.
(6) Pits shall be placed at least 20 feet from any fill slope.
(7) Pits shall be used only in deep fill areas.

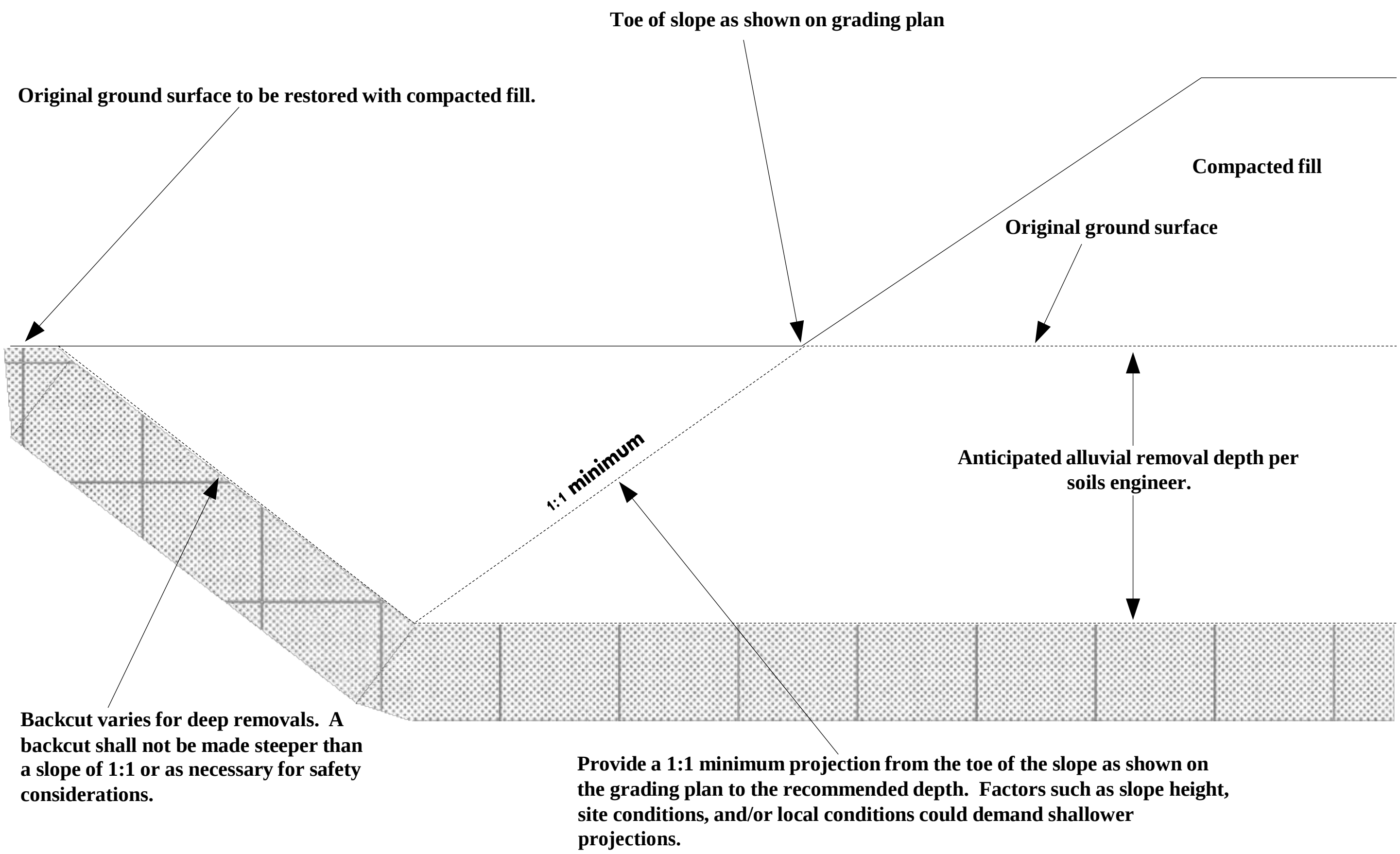
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
ROCK DISPOSAL PITS

EEI
Engineering Solutions

FIGURE C

DETAIL FOR FILL SLOPE TOEING OUT ON FLAT ALLUVIATED CANYON



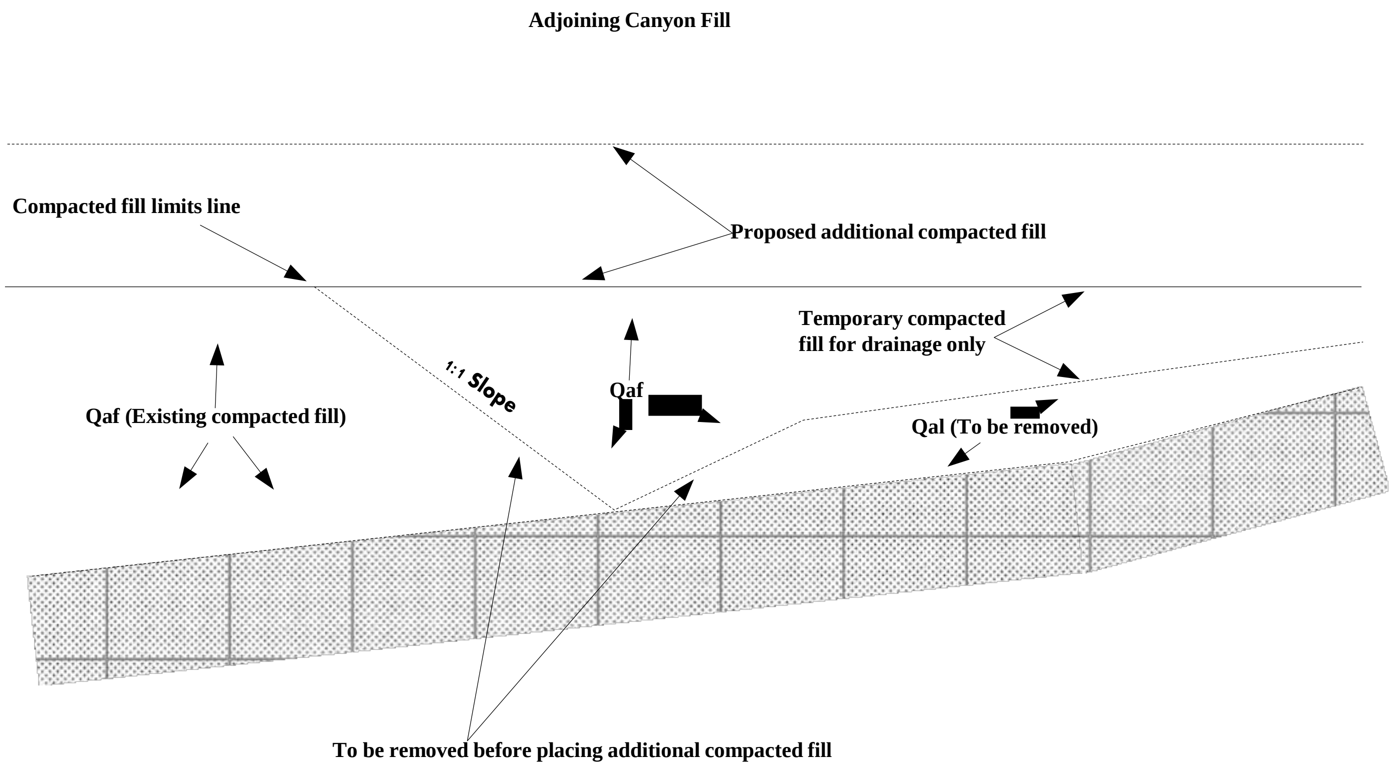
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
DETAIL FOR FILL SLOPE TOEING OUT ON A FLAT ALLUVIATED CANYON

EEI
Engineering Solutions

FIGURE D

REMOVAL ADJACENT TO EXISTING FILL



Legend

Qaf - **Artificial Fill**

Qal - **Alluvium**

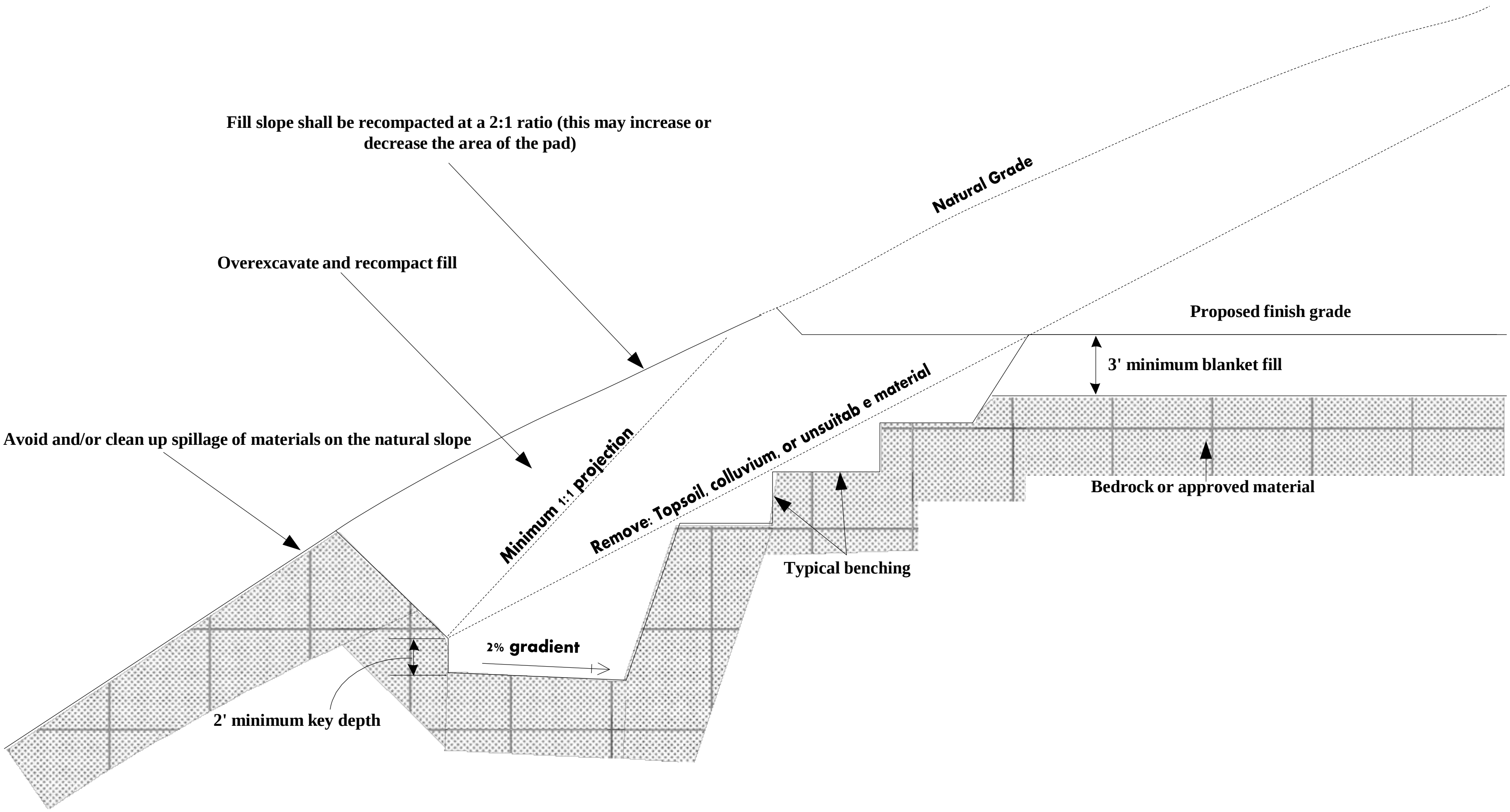
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
REMOVAL ADJACENT TO EXISTING FILL

EEI
Engineering Solutions

FIGURE E

DAYLIGHT CUT LOT DETAIL



Note: (1) Subdrain and key width requirements shall be determined based on exposed subsurface conditions and the thickness of overburden.

(2) Pad overexcavation and recompaction shall be completed if determined as necessary by the soils engineer and/or engineering geologist.

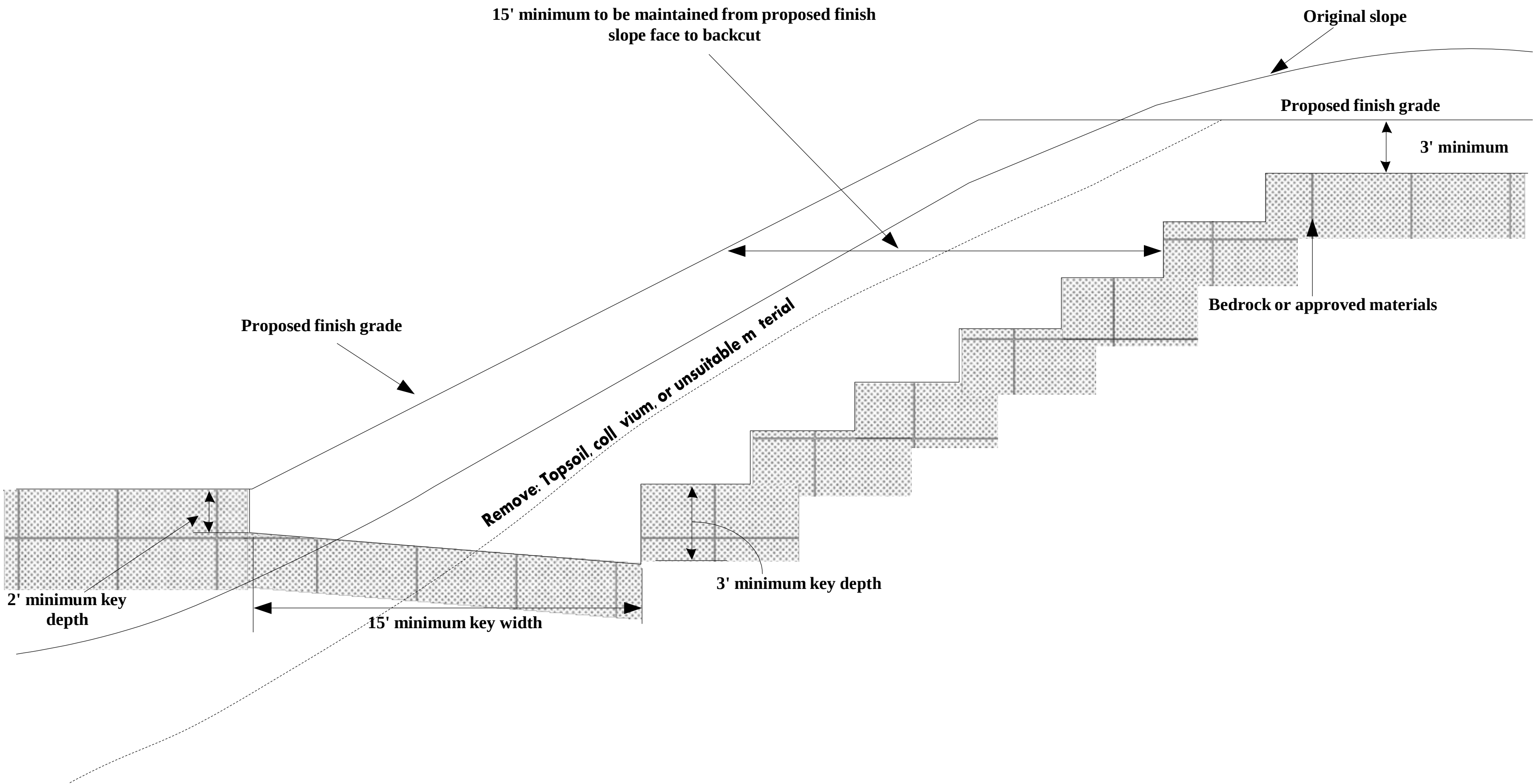
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
DAYLIGHT CUT LOT DETAIL

EEI
Engineering Solutions

FIGURE F

SKIN FILL OF NATURAL GROUND



Note: (1) The need and disposition of drains will be determined by the soils engineer and/or engineering geologist based on site conditions.

(2) Pad overexcavation and recompaction shall be completed if determined as necessary by the soils engineer and/or engineering geologist.

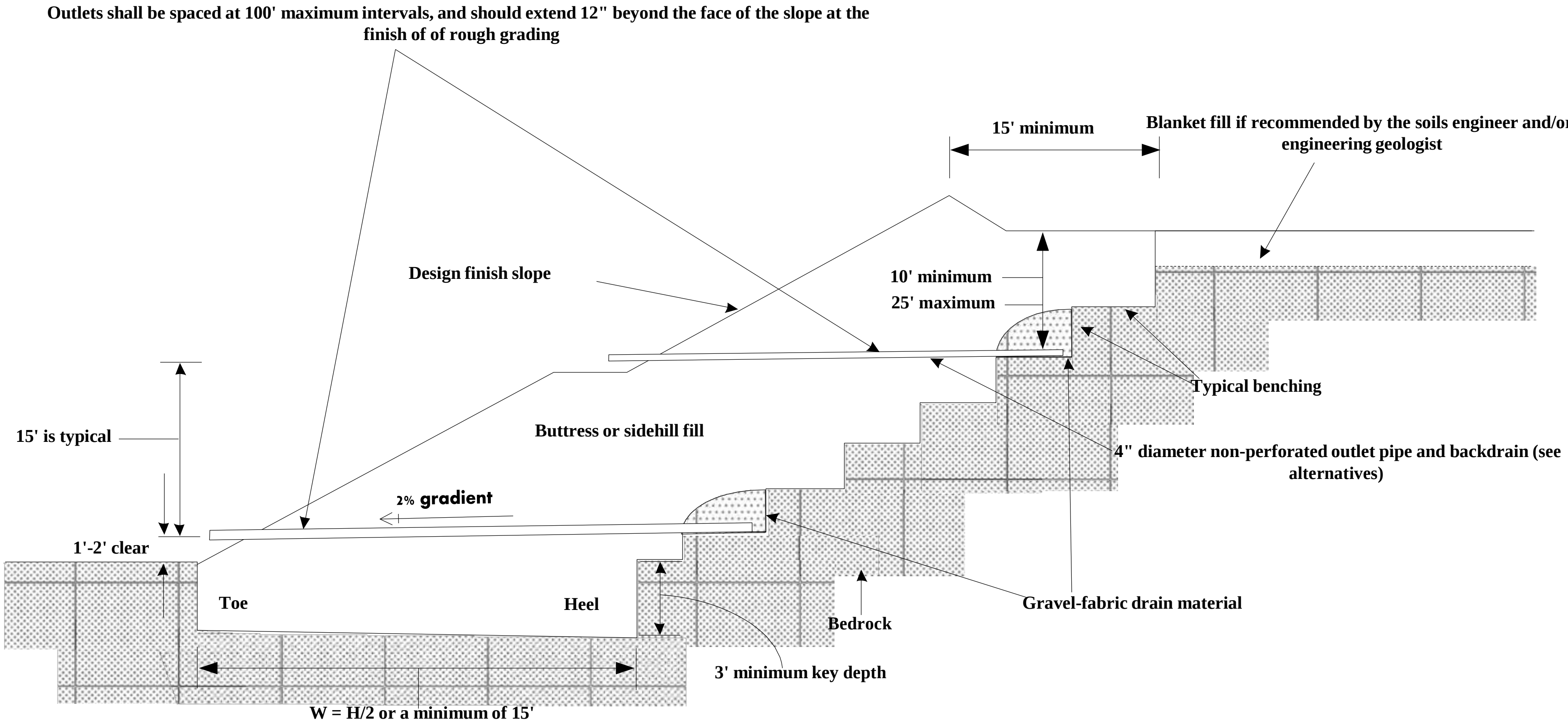
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
SKIN FILL OF NATURAL GROUND

EEI
Engineering Solutions

FIGURE G

TYPICAL STABILIZATION BUTTRESS FILL DESIGN



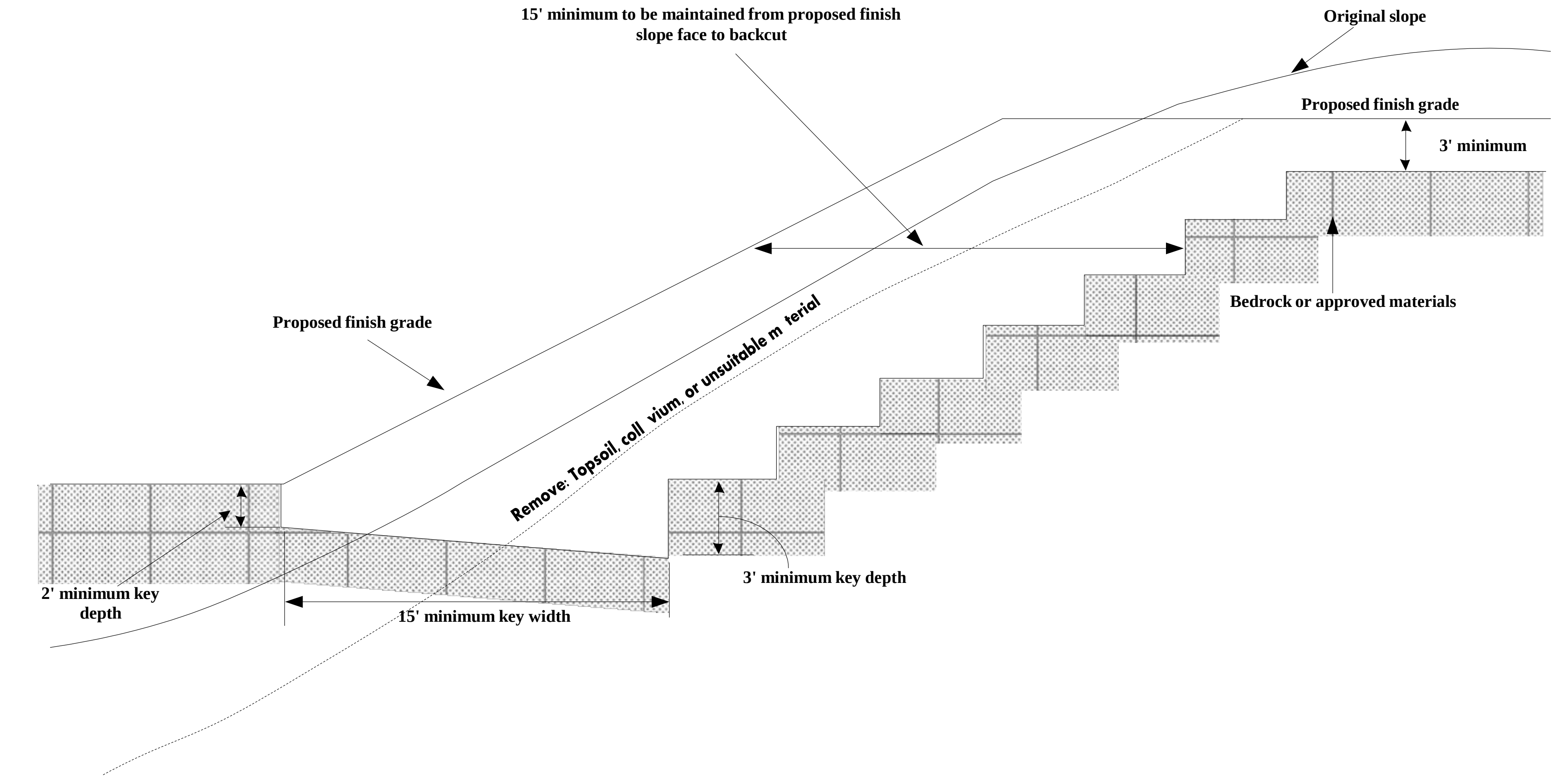
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
TYPICAL STABILIZATION BUTTRESS FILL DESIGN

EEI
Engineering Solutions

FIGURE H

SKIN FILL OF NATURAL GROUND



Note: (1) The need and disposition of drains will be determined by the soils engineer and/or engineering geologist based on site conditions.

(2) Pad overexcavation and recompaction shall be completed if determined as necessary by the soils engineer and/or engineering geologist.

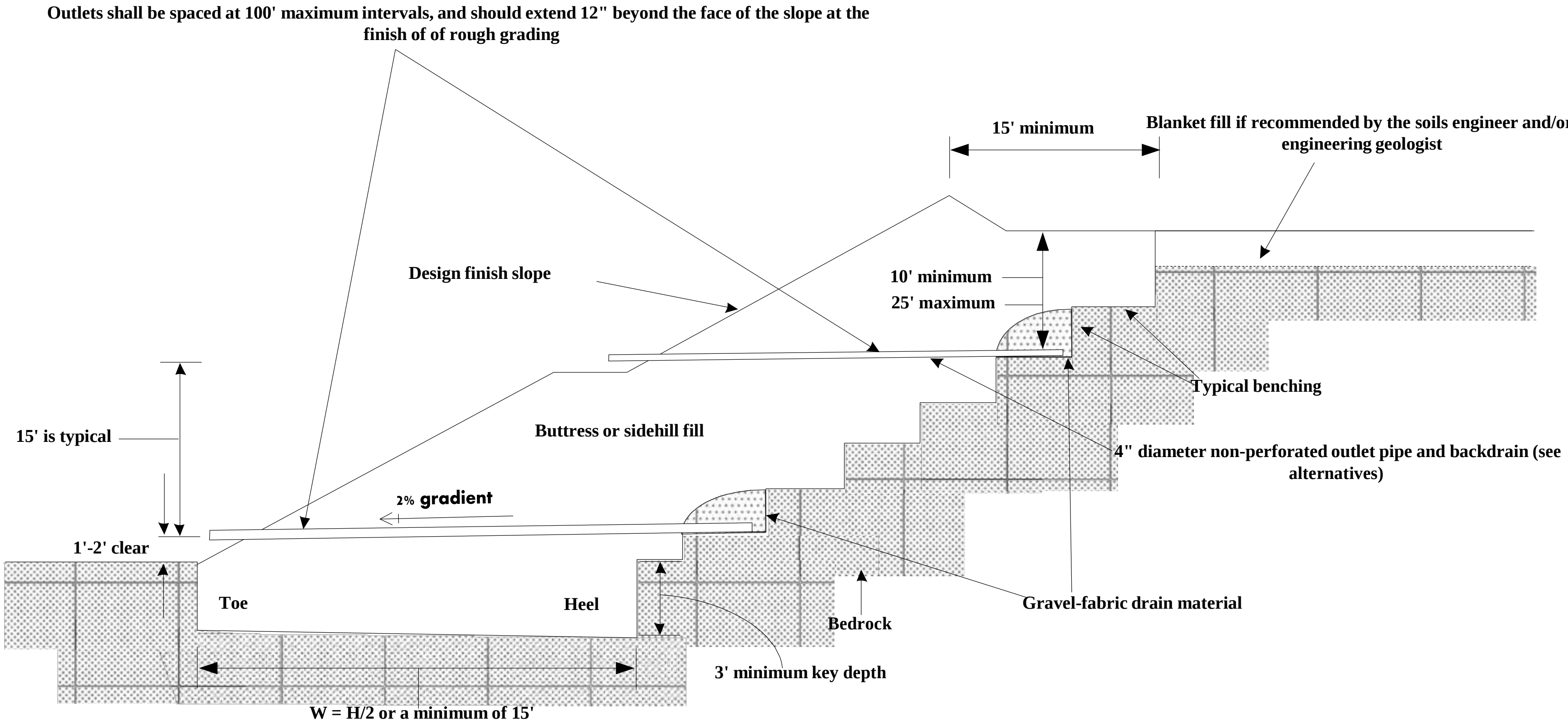
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
SKIN FILL OF NATURAL GROUND

EEI
Engineering Solutions

FIGURE G

TYPICAL STABILIZATION BUTTRESS FILL DESIGN



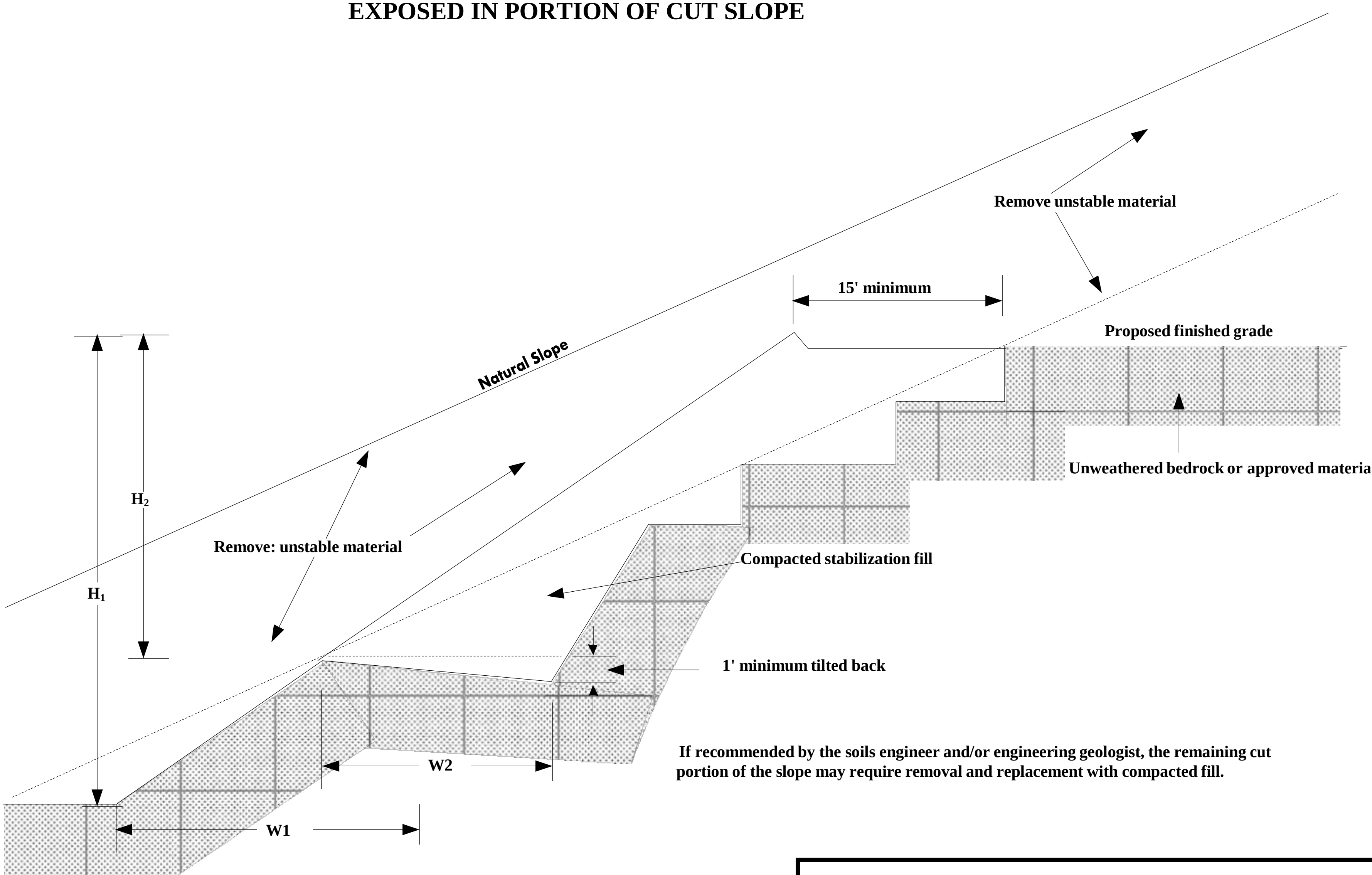
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
TYPICAL STABILIZATION BUTTRESS FILL DESIGN

EEI
Engineering Solutions

FIGURE H

STABILIZATION FILL FOR UNSTABLE MATERIAL EXPOSED IN PORTION OF CUT SLOPE



Note: (1) Subdrains are required only if specified by the soils engineer and/or engineering geologist.
(2) "W" shall be the equipment width (15') for slope heights less than 25 feet. For slopes greater than 25 feet "W" shall be determined by the project soils engineer and/or the engineering geologist. "W" shall never be less than H/2.

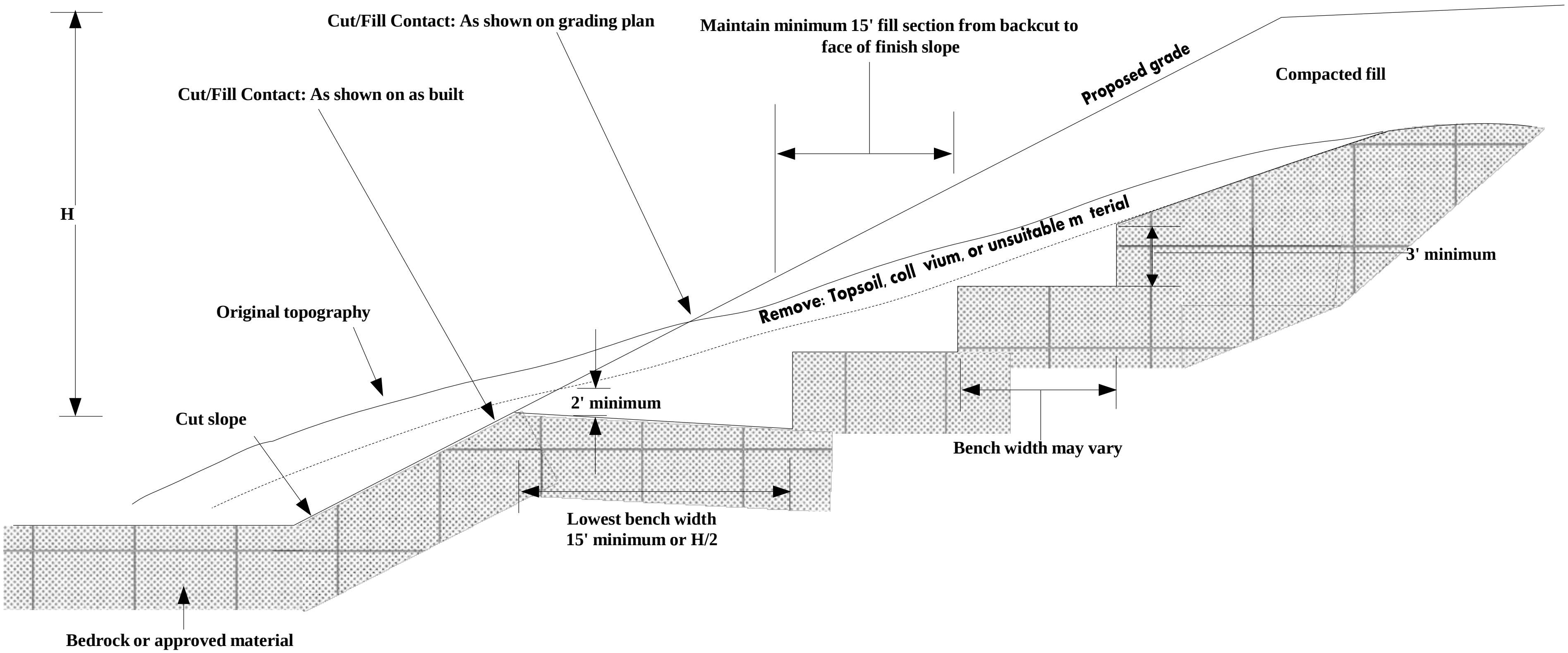
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
STABILIZATION FILL FOR UNSTABLE MATERIAL
EXPOSED IN PORTION OF CUT SLOPE

EEI
Engineering Solutions

FIGURE I

FILL OVER CUT DETAIL



Note: The cut sectioin shall be excavated and evaluated by the soils engineer/engineering geologist prior to constructing the fill portion.

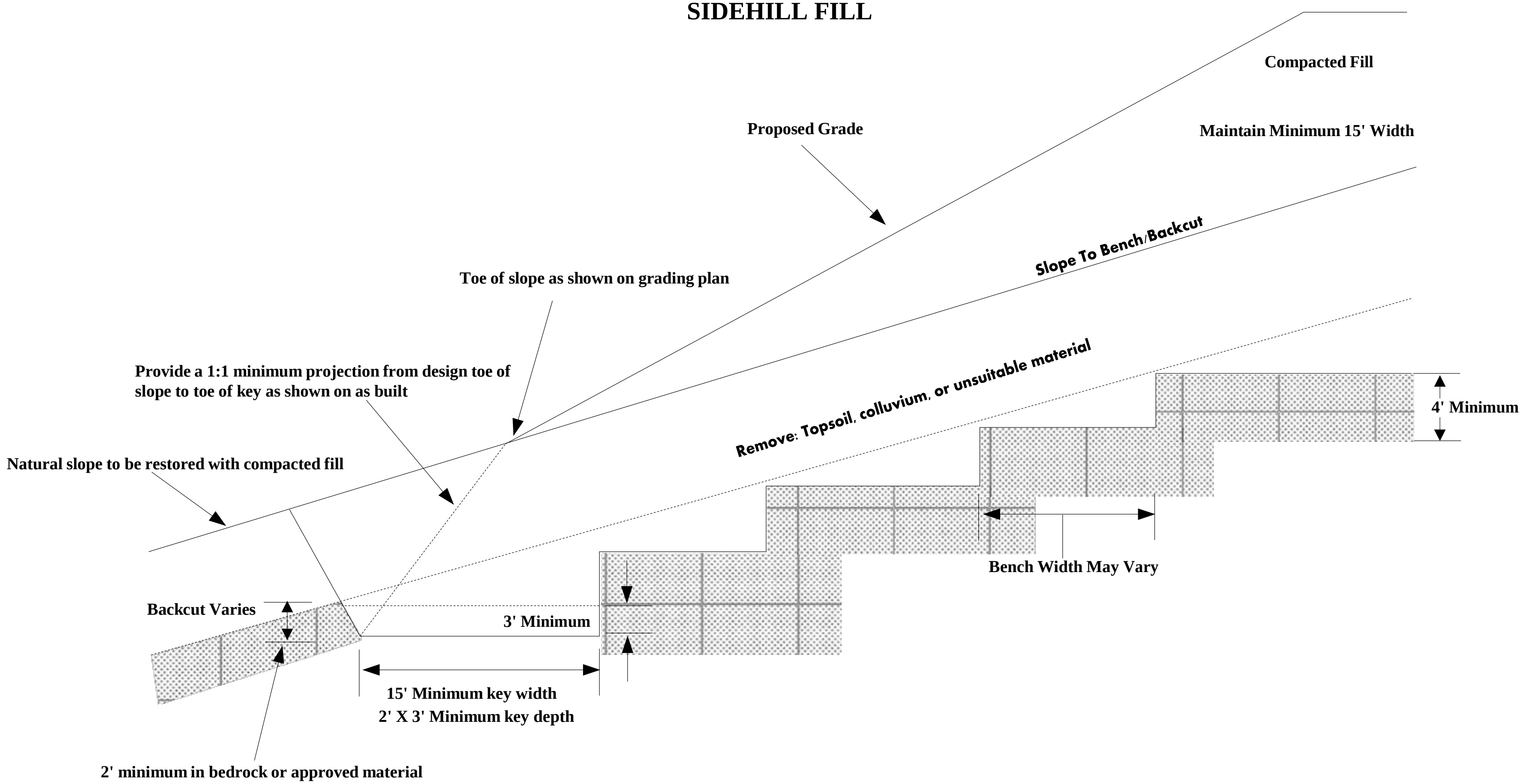
Note: Figure not to scale

EARTHWORK AND GRADING GUIDELINES
FILL OVER CUT DETAIL

EEI
Engineering Solutions

FIGURE J

FILL OVER NATURAL DETAIL
SIDEHILL FILL



Note: (1) Special recommendations shall be provided by the soils engineer/engineering geologist where the natural slope approaches or exceeds the design slope ratio.
(2) The need for and disposition of drains would be determined by the soils engineer/engineering geologist based upon exposed conditions.

Note: Figures not to scale

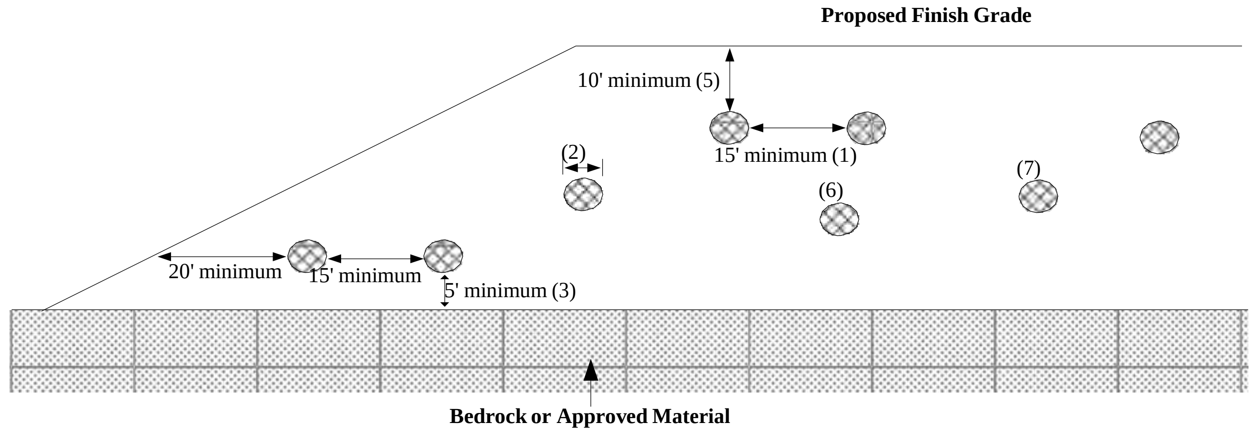
EARTHWORK AND GRADING GUIDELINES
FILL OVER NATURAL DETAIL SIDEHILL FILL

EEI
Engineering Solutions

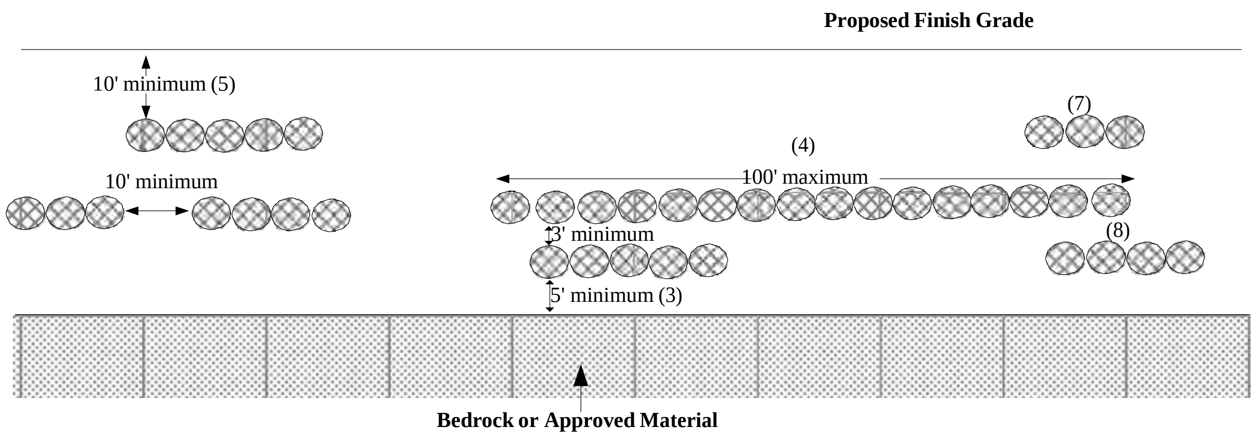
FIGURE K

OVERSIZE ROCK DISPOSAL

View Normal to Slope Face

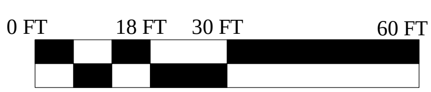


View Parallel to Slope Face



Note:
(1) One Equipment width or a minimum of 15 feet.
(2) Height and width may vary depending on rock size and type of equipment used. Length of windrow shall be no greater than 100 feet maximum.
(3) If approved by the soils engineer and/or engineering geologist.
(4) Orientation of windrows may vary but shall be as recommended by the soils engineer and/or engineering geologist. Unless recommended staggering of windrows is not necessary.
(5) Areas shall be cleared for utility trenches, foundations, and swimming pools.
(6) Voids in windrows shall be filled by flooding granular soil into place. Granular soil shall be any soil which has a unified soil classification system (Universal Building Code (UBC) 29-1). Designation of SM, SP, SW, GP, or GW.
(7) After fill between windrows is placed and compacted with the lift of fill covering windrow, windrow shall be proof rolled with a D-9 dozer or equivalent.
(8) Oversized rock is defined as larger than 12", and less than 4 feet in size.

Approximate Scale: 1" = 30'



Note: All distances are approximate

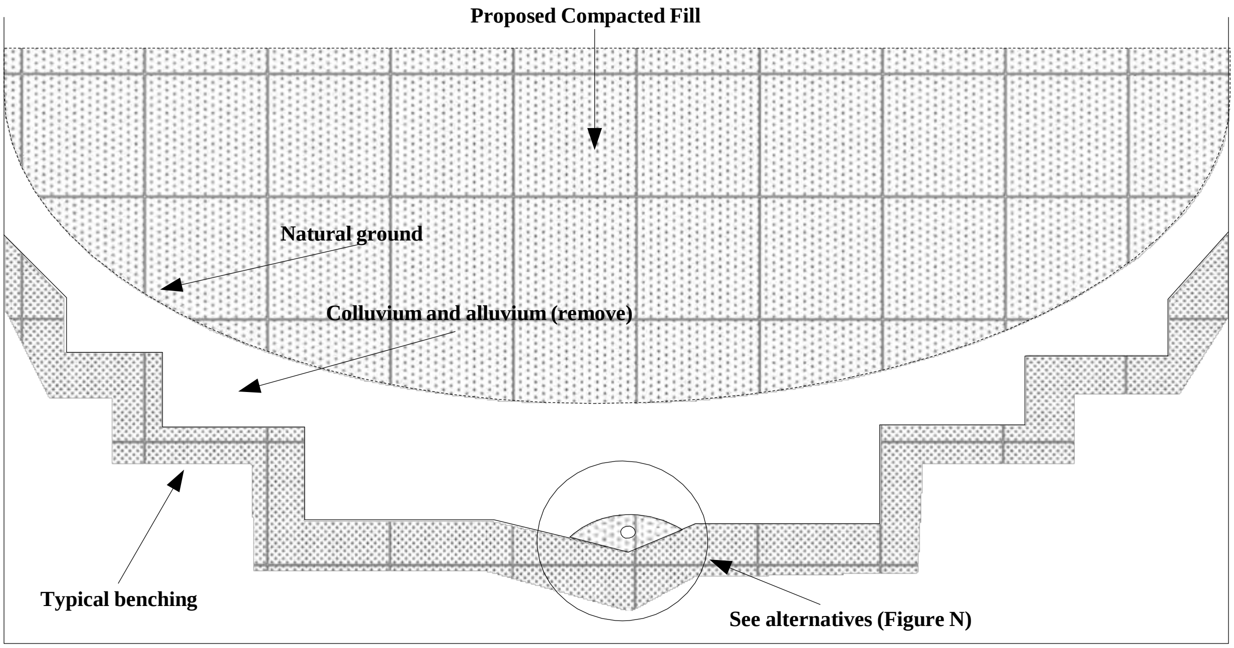
EARTHWORK AND GRADING GUIDELINES
OVERSIZE ROCK DISPOSAL

EEI
Engineering Solutions

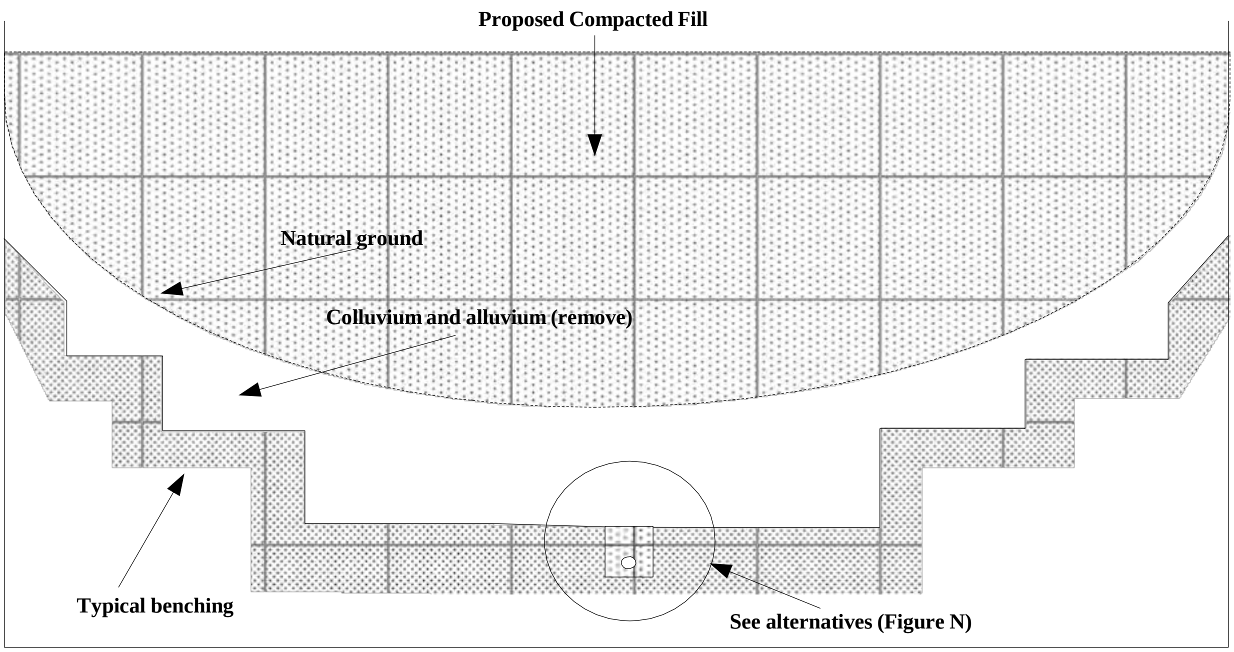
FIGURE L

CANYON SUBDRAIN DETAIL

Type A



Type B



Note: Alternatives, locations, and extent of subdrains should be determined by the soils engineer and/or engineering geologist during actual grading.

EARTHWORK AND GRADING GUIDELINES
CANYON SUBDRAIN DETAIL

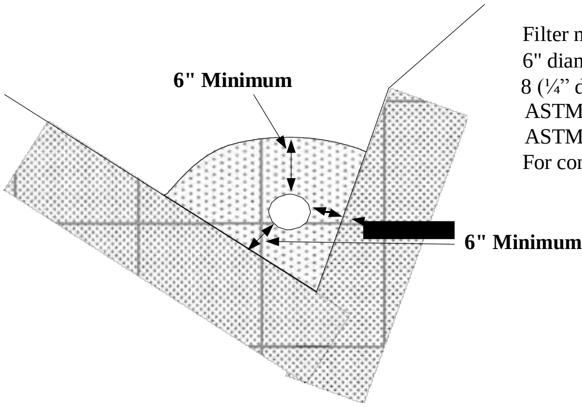
EEI
Engineering Solutions

FIGURE M

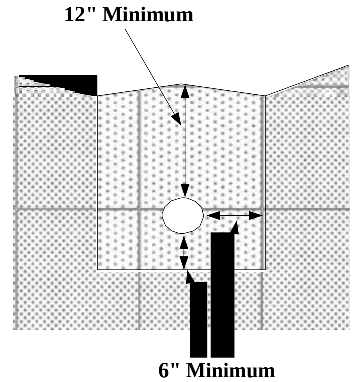
Note: Figures not to scale

CANYON SUBDRAIN ALTERNATE DETAILS

Alternate 1: Perforated Pipe and Filter Material



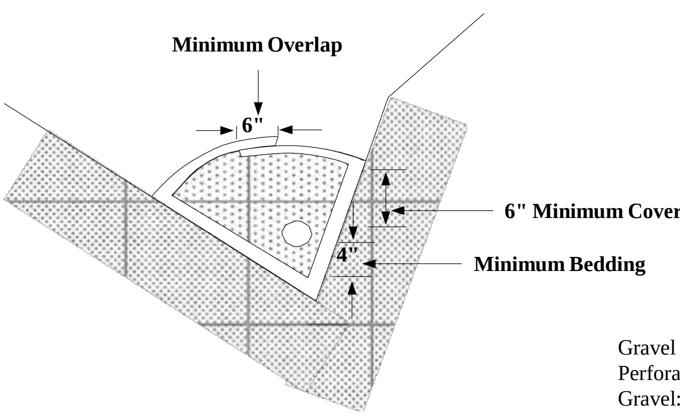
Filter material: Minimum volume of 9 feet^3/linear foot.
6" diameter ABS or PVC pipe or approved substitute with minimum 8 (¼" diameter) perforations per linear foot in bottom half of pipe.
ASTM D 2751, SDR 35 or ASTM D 1527, Schedule 40.
ASTM D 3034, SDR 35 or ASTM D 1785, Schedule 40.
For continuous run in excess of 500 feet use 8" diameter pipe.

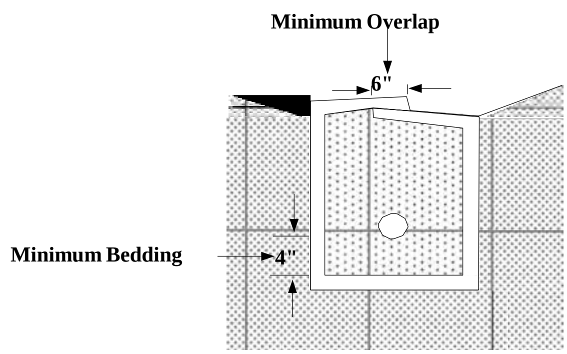


Filter Material

Sieve Size	Percent Passing
1"	100
¾"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

Alternate 2: Perforated Pipe, Gravel and Filter Fabric





Gravel material 9 feet^3/linear foot.
Perforated pipe: see alternate 1.
Gravel: Clean ¾" rock or approved substitute.
Filter Fabric: Mirafi 140 or approved substitute.

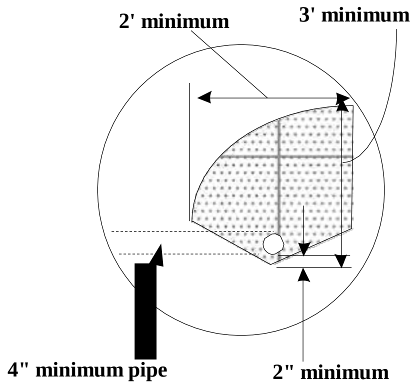
Note: Figures not to scale

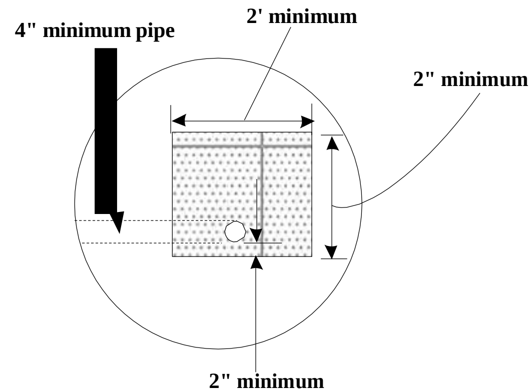
EARTHWORK AND GRADING GUIDELINES
CANYON SUBDRAIN ALTERNATE DETAILS

EEI
Engineering Solutions

FIGURE N

TYPICAL STABILIZATION BUTTRESS SUBDRAIN DETAIL





Filter Material: Minimum of 5 ft^3/linear foot of pipe or 4 ft^3/linear foot of pipe when placed in square cut trench.

Alternative In Lieu Of Filter Material: Gravel may be encased in approved filter fabric. Filter fabric shall be mirafi 140 or equivalent. Filter fabric shall be lapped a minimum of 12" on all joints.

Minimum 4" Diameter Pipe: ABS-ASTM D-2751, SDR 35 or ASTM D-1527 schedule 40 PVC-ASTM D-3034, SDR 35 or ASTM D-1785 schedule 40 with a crushing strength of 1,000 pounds minimum, and a minimum of 8 uniformly spaced perforations per foot of pipe installed with perforations at bottom of pipe. Provide cap at upstream end of pipe. Slope at 2% to outlet pipe. Outlet pipe shall be connected to the subdrain pipe with tee or elbow.

Note: (1) Trench for outlet pipes shall be backfilled with onsite soil.
(2) Backdrains and lateral drains shall be located at the elevation of every bench drain. First drain shall be located at the elevation just above the lower lot grade. Additional drains may be required at the discretion of the soils engineer and/or engineering geologist.

Filter Material – Shall be of the following specification or an approved equivalent:

Filter Material

Sieve Size	Percent Passing
1"	100
¾"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

Gravel - Shall be of the following specification or an approved equivalent:

Filter Material

Sieve Size	Percent Passing
1½"	100
No. 4	50
No. 200	8

Sand equivalent: Minimum of 50

Note: Figures not to scale

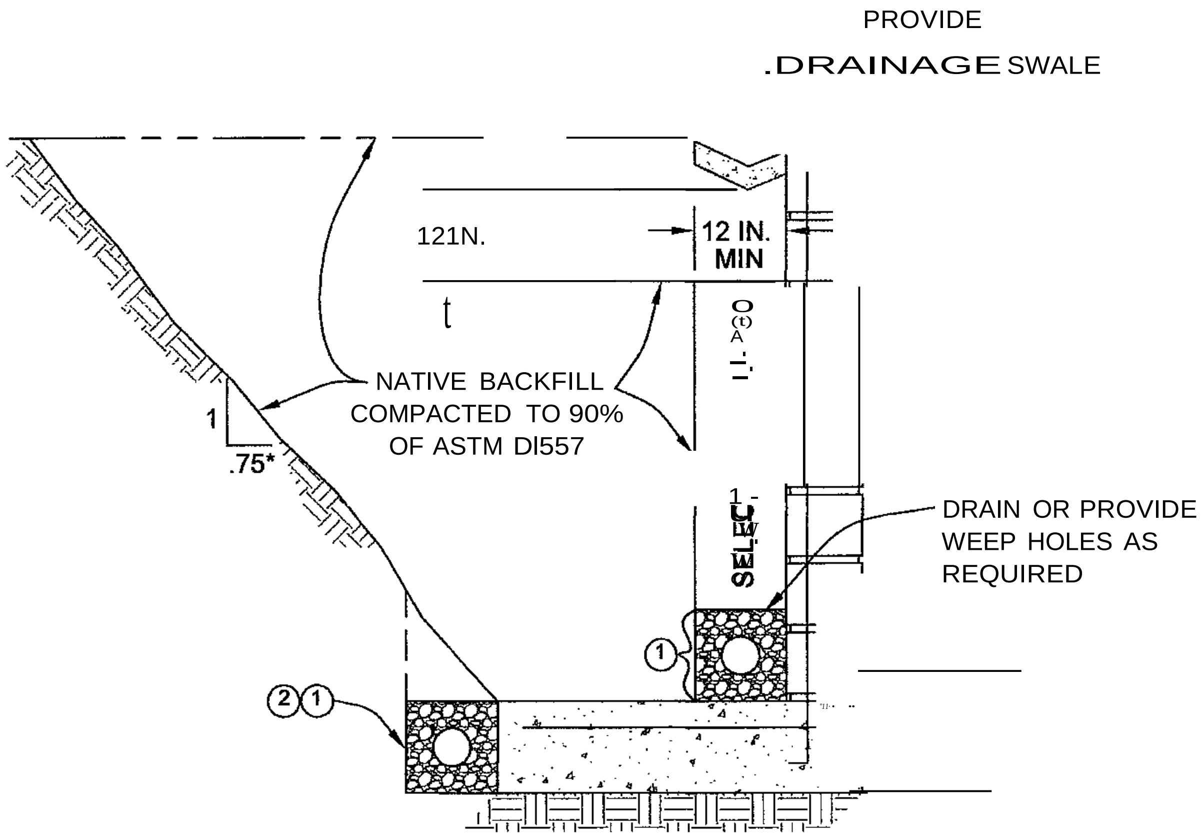
EARTHWORK AND GRADING GUIDELINES

TYPICAL STABILIZATION BUTTRESS SUBDRAIN DETAIL

EEI

Engineering Solutions

FIGURE O



* OR AS REQUIRED FOR SAFETY

NOTES

(1) 4-INCH PERFORATED PVC SCHEDULE 40 OR APPROVED ALTERNATE. PLACE PERFORATION DOWN AND SURROUND WITH A MINIMUM OF 1 CUBIC FOOT PER LINEAL FOOT (1 FT. /FT.) OF 3/4 INCH ROCK OR APPROVED ALTERNATE AND WRAPPED IN FILTER FABRIC.

(2) PLACE DRAIN AS SHOWN WHERE MOISTURE MIGRATION THROUGH THE WALL IS UNDESIRABLE.

NOTE: FIGURE NOT TO SCALE

EARTHWORK & GRADING GUIDELINES

TYPICAL RETAINING WALL BACKFILL

EEI

Engineering Solutions

FIGURE P

ATTACHMENT 7
Storm Water Quality Assessment Form

This is the cover sheet for Attachment 7.

Placeholder – **Storm Water Quality Assessment Form**

Replace placeholder with a copy of the Storm Water Quality Assessment Form.

City of Oceanside – Engineering Division – Clean Water Program

STORM WATER QUALITY ASSESSMENT FOR PLANNING, ENGINEERING, AND BUILDING PERMIT APPLICATIONS

All applications for Planning, Engineering, or Building Division permits are required to complete this assessment form and include it as part of the initial permit application submittal. Staff will review the permit application content to determine the applicability of State and City storm water requirements. Please note a storm water assessment cannot be provided without a complete permit application package.

Section 1 – Project Information	
Applicant Name: PROTEA SENIOR LIVING OCEANSIDE, LLC	Phone Number: (949) 677-8795
Project Name: OCEAN HILLS ALF	Email Address (Optional):
Project Site Address: 4500 CANNON ROAD, OCEANSIDE, CA 92056	Street Intersection: CANNON ROAD AND MYSTRA WAY
Assessor Parcel Number(s): 169-562-01	Total Parcel Area (acres or square feet): 6.46
Project Description: ASSISTED LIVING FACILITY	Proposed Project Impervious Area (acres or square feet): 2.21

Section 2 – Identify Project Type	
☒	New Development Project – go to Section 3
☐	Redevelopment Project go to Section 3
☐	None of the above – Skip Section 3 and go to Section 4

Section 3 – Identify Applicable Priority Development Project Categories	
☒	**New Development Project** – A project that creates 10,000 square feet or more of impervious surfaces (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
☐	**Redevelopment Project** – A project that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
☐	**Restaurants** – Category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812); where new or redevelopment projects that create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Hillside Development** – Category includes development on any natural slope that is twenty-five percent or greater; where new or redevelopment projects that create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☒	**Parking Lots** – Category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce; where new or redevelopment projects that create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Streets, Roads, Highways, Freeways, and Driveways** – Category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles; where new or redevelopment projects that create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Water Quality Environmentally Sensitive Area** – New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to a Water Quality Environmentally Sensitive Area (WQESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the WQESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).
☐	**Automotive Repair Shop** – Category is defined as a facility that is categorized in any one of the following Standard Industrial Classification (SIC) codes: 5013, 5014, 5541, 7532-7534, or 7536-7539, where new or redevelopment projects that create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☐	**Retail Gasoline Outlet (RGOs)** – Category includes RGOs that meet the following criteria (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day; where new or redevelopment projects that create and/or replace 5,000 square feet or more impervious surface (collectively over the entire project site).
☒	**Development Projects greater than one acre** – New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction.
☐	**None of the Above**

Section 4 – Identify Permit Application Type	
☒	**Discretionary Permit Application**: Specific Plan (S), General Plan Amendment (GPA), Zone Amendment (ZA), Tentative Map (T), Tentative Parcel Map (P), Development Plan (D), Conditional Use Permit (CUP), Variance (V), Regular Coastal Permit (RC), Historic Permit (H), Reclamation Plan, Planned Development Permit, Planned Unit Development Permit, Planning Commission Approval of Plans, Site Plan Review, Tentative Map Amendments to Conditions of Approval or Time Extension, Variance.
☐	**Administrative Permit Application**: Administrative Clearing Permit, Lot Line Adjustment, Final Map Modification, Grading Plan (including modification or renewal), Improvement Plan (including modification), Landscape Plan, Building Permit, Construction Right-of-Way Permit, Encroachment Permit, Excavation Permit, On-site Wastewater System Permit, Underground Tank Permit, Well Permit, or etc.

Section 5 – Applicant Certification	
Name of Responsible Party: MAHIR WABER, MBA, P.E., LEED AP, WABER CONSULTANTS, INC	Phone Number: (562) 426-8283
Email Address (optional)	FAX Number (optional):
I understand and acknowledge the City of Oceanside has adopted minimum requirements, as mandated by the San Diego Regional Water Quality Control Board – Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100 (NPDES NO. CAS0109266) for mitigating impacts associated with urban runoff, including storm water from construction and land development activities. I certify this assessment has been accurately completed to the best of my knowledge and is consistent with the proposed project. I acknowledge that non-compliance with the City Best Management Practice (BMP) Design Manual, Grading Ordinance, and Erosion Control Ordinance may result in enforcement action by the City, the California State Water Resources Control Board, and/or the San Diego Regional Water Quality Control Board. Enforcement action may include stop work orders, notice of violation, fines, or other actions.	
Applicant Signature:	Date:

Completion Guidance

Please note – the Applicant is requested to complete this form and submit as part of the project application. For assistance, please contact Development Services at (760) 435-4373.

Section 1 – Project Information

1. Applicant Name – provide name of Individual completing form, i.e. Owner or Owner Representative
2. Phone Number – provide phone number of Individual completing form, i.e. Owner or Owner Representative
3. Project Name – provide project name (consistent with project application) i.e. Jones Residence, Example Commercial Development, and etc
4. Email Address (Optional) – provide email address if you want to receive a digital copy of the project Storm Water Determination
5. Project Site Address – provide a physical address for the proposed project
6. Street Intersection – provide nearest intersecting streets
7. Assessor Parcel Number(s) – provide Assessor Parcel Number(s); refer to title documents or contact City Staff for assistance
8. Total Parcel Area (acres or square feet) – provide the parcel area; refer to title documents
9. Project Description – provide a brief project description (e.g. single-family dwelling, retail business, repair shop, and etc)
10. Approximate Proposed Project Impervious Area (acres or square feet) – provide the approximate total area of all impervious surfaces (includes roofs, sidewalk, patios, driveways, and etc)

Section 2 – Identify Project Type

1. New Development – check box if proposed project is a new development (i.e. the parcel is undeveloped and there are no existing paved surfaces or structures on the site) – if project is a new development go to Section 3.
2. Redevelopment – check box if proposed project includes the redevelopment of an existing site (i.e. replacement, rehabilitation, or reconfiguring of existing structures or paved surfaces) – if project is a "redevelopment" go to Section 3
3. None of the above – check box if proposed project is not a new development or a redevelopment; skip Section 3 and go to Section 4

Section 3 – Identify Applicable Priority Development Project Categories

1. Review each category and check the appropriate boxes that apply to your project.
2. General identification of Automotive Repair Shop SIC (Standard Industrial Classifications) as follows:
   - 5013 – Motor vehicle supplies and new parts
   - 5014 – Tires and tubes
   - 5541 – Gasoline service stations
   - 7532 – Top and body repair, and paint shops
   - 7533 – Auto exhaust system repair shops
   - 7534 – Tire retreading and repair shops
   - 7536 – Automotive glass replacement shops
   - 7537 – Automotive transmission repair shops
   - 7538 – General automotive repair shops
   - 7539 – Automotive repair shops-not elsewhere classified
3. Contact Storm Water Development Review Staff at (760) 435-5164 for assistance in determining applicability of Water Quality Environmentally Sensitive Area (WQESA) category
4. If no categories apply, check "None of the above"

Section 4 – Identify Permit Application Type

1. Identify the applicable permit application type. In general, Discretionary permits applications require a public hearing, whereas Administrative permits may be approved by Staff. Suggest obtaining assistance at the City Development Services Counter Staff and from City Planning Staff. Guidance may be obtained by telephone at (760) 435-4373.

Section 5 – Applicant Certification

1. Name of Responsible Party – provide name of Owner
2 Phone Number – provide phone number of Owner
3. Email Address (Optional) – provide email address if you want to receive a digital copy of the project Storm Water Determination
4. FAX Number (Optional) – provide FAX number if you want to receive a digital copy of the project Storm Water Determination
5. Applicant Signature – provide signature of Individual completing form, i.e. Owner or Owner Representative
6. Date – provide date current date

[Insert other supporting documentation here]

APPENDIX F

Noise Study

Noise Impact Analysis
for
Ocean Hills Senior Living Facility

Located in the
City of Oceanside, California

Prepared for:

Mr. Hans van der Laan
Protea Capital Partners
18 Ventana Ridge Drive
Aliso Viejo, CA 92656

Prepared by:

Roma Environmental
CEQA, NEPA, Noise and Air Quality
roma@romaenvironmental.com
951-544-3170

April 29, 2019

Table of Contents

APPENDICES

List of Tables

List of Figures

I. Introduction and Setting

A. Purpose and Objectives

The purpose of this report is to evaluate the existing noise environment at the Ocean Hills Senior Living Facility in order to determine if propose project is likely to result in violations of applicable noise standards.

B. Project Location

Protea Senior Living (Applicant) is proposing to construct a Senior Living Facility on a 6.46 acre-site located at the north corner of the intersection of Cannon Road and Mystra Drive, in the City of Oceanside. The Assessor's Parcel Number is 192-562-01-00. The vicinity map showing the project location is provided on Figure 1.

C. Project Description

The proposed Senior Living Facility consists of two phases. Phase 1, which is situated on the southern 3.53 acres of the site, has already been approved by the City of Oceanside; construction has been completed, and a Certificate of Occupancy has been issued by the City of Oceanside and Phase 2 which will include construction of one new 103,004 square foot three-story building to include 102 resident units. Figure 2 illustrates the project site plan.

Phase one is comprised of one 81,764 square-foot, two-story building, with 114 residential units. The Phase 1 building also includes a reception area, a lobby, administrative offices, a kitchen, dining rooms, a coffee bar, an ice cream bar, beauty salon, recreational rooms, patios and miscellaneous utility rooms. A small dog park is also proposed as part of Phase 1.

Fifty (50) parking stalls, including 2 electric vehicle spaces, 2 disabled access spaces, and 1 van accessible space have been included in the development of Phase 1.

The highest peaks of the proposed Phase 1 building reach up to 34'-0" high (with parapets).

During the construction of Phase 1, the Applicant decided to purchase the rest of the 6.46 acre site in order to develop an additional 102 units of senior living for more active seniors. The intention of the proposed project is to create a mini congregate care campus for seniors to allow them to age in place. Construction of Phase 2 is expected to commence in October 2019 and last through March 2021.

Phase 2 will include construction of one new 103,004 square foot three-story building and will include 102 residential units. The proposed senior living community will include a variety of resident activity and support spaces such as a lobby with reception & administrative offices, a lounge, sports bar/bistro area, media/theater room, game room, as well as a main dining, a display kitchen, laundry, offices and fitness and activity space on the first floor. Outdoor amenities include pool, spa, bocce ball court, putting green and fitness area.

Phase 2 will include 103 parking stalls including 95 standard spaces, 4 accessible access spaces, 1 van accessible space, and 3 electrical vehicle parking spaces. Anticipated covered spaces will be considered for solar panels (electrical) or solar ready roof. Landscape coverage for Phase II is (20%) or 31,136 square feet.

Both of the proposed buildings will be constructed as California Building Code Type VA, and will be fully sprinklered per National Fire Protection Association 13. Occupancy classification will be mixed use predominately Residential Group R-2.1, with associated Assembly Group A-2, A-3 & Business (B) as well as accessory uses Low Hazard Storage (S-2), Utility (U) and Miscellaneous.

The proposed senior care building design will feature a contemporary design that will include stucco wall and brick accent coverings, wood shutters, terra-cotta roofing tiles, gable roof designs, and deviating wall planes for articulation. The use of articulated building massing, select materials and details are proposed to create a residential campus design that would retain the essence of the residential land use within the area, while creating an architectural transition between existing residential and the intuitional church buildings within the immediate area. The highest peaks of the proposed Phase 2 building be reach up to 46’-6” high (with parapets). Grading activities associated with Phase 2 will result in approximately 2,562 cubic yards (CY) of cut and 2,502 CY of fill. Approximately 60 CY of soil that will be exported offsite.

The entire facility will employ approximately 40 full time and part time members of staff working at peak times (8:00 am to 6:00 pm).

The site has an existing General Plan Land Use designation of General Commercial and is currently zoned as Limited Commercial District (CL). The Project site is not located within the Coastal Zone and is therefore not subject to the City’s Local Coastal Program.

Figure 1
Project Location

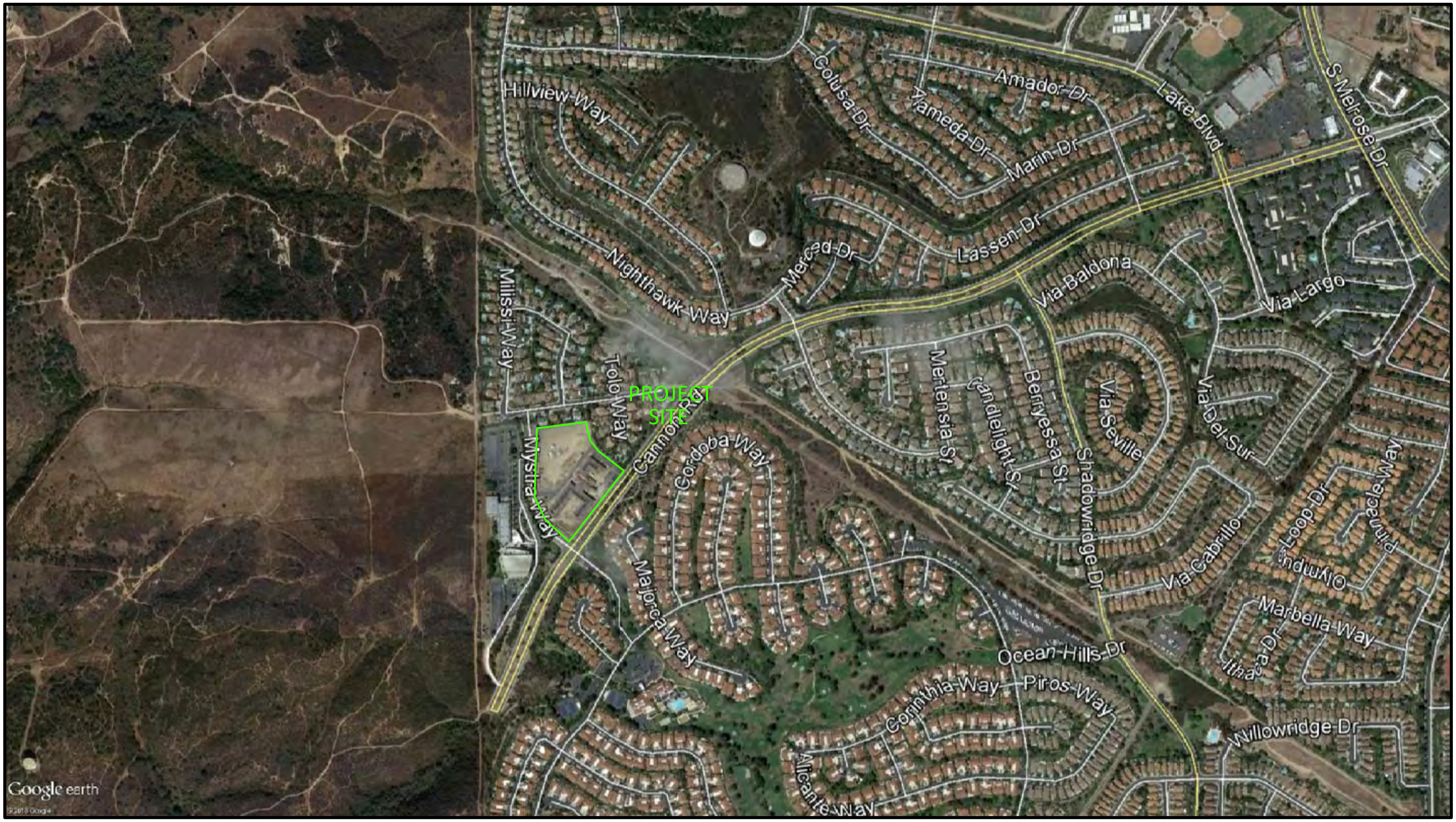
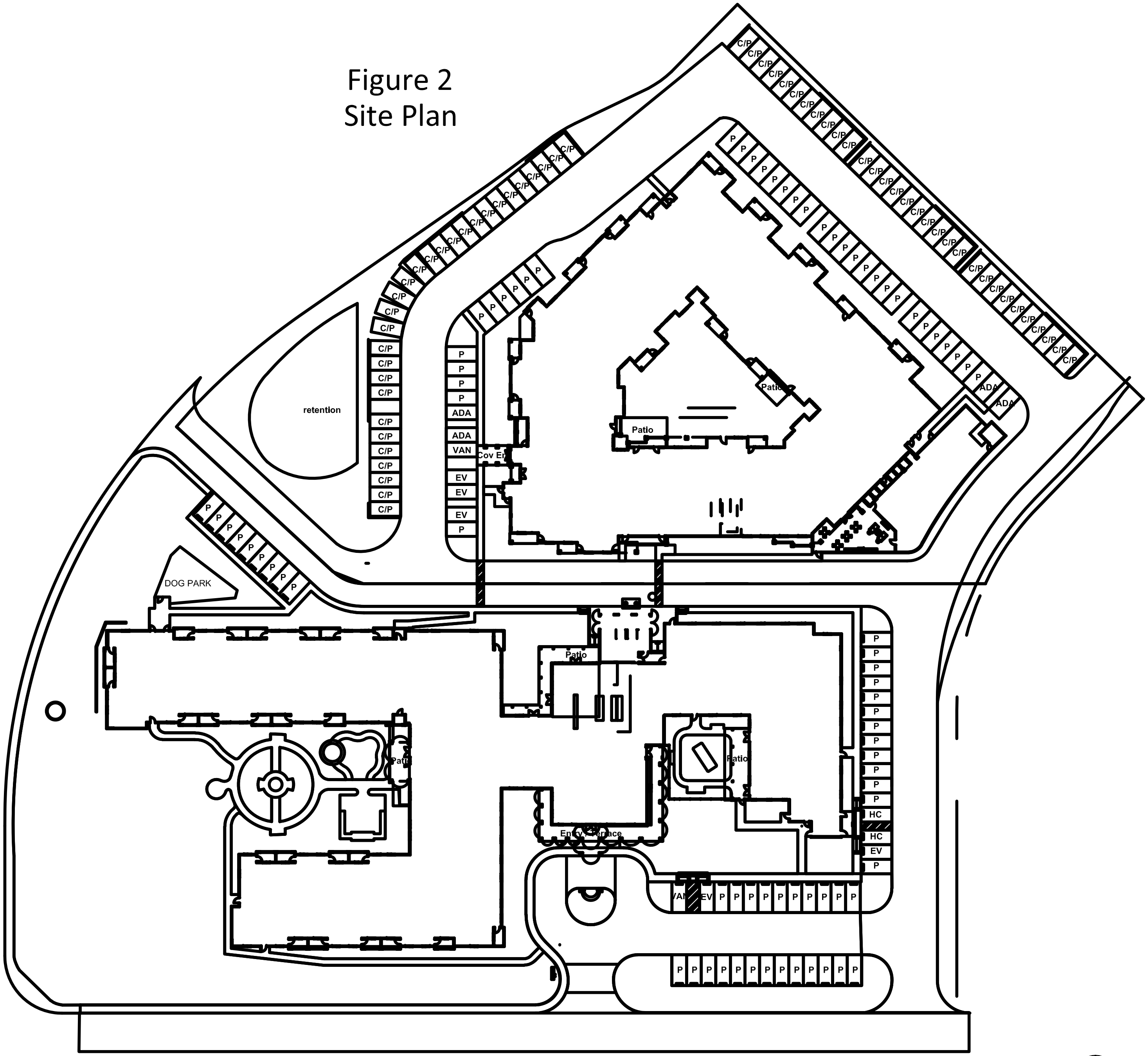


Figure 2
Site Plan



II. Noise and Vibration Fundamentals

A. Noise Fundamentals

Sound is a pressure wave created by a moving or vibrating source that travels through an elastic medium such as air. Noise is defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in extreme circumstances, hearing impairment.

Definitions of commonly used noise terms are presented in Table 1. Commonly used acronyms are presented in Table 2. The unit of measurement used to describe a noise level is the decibel (dB). The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, the "A-weighted" noise scale, which weights the frequencies to which humans are sensitive, is used for measurements. Noise levels using A-weighted measurements are written dB(A) or dBA.

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. The noise drop-off rate associated with point source noise is 6 dBA per each doubling of the distance (dBA/DD).

Decibels are measured on a logarithmic scale, which quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as a doubled traffic volume, would increase the noise levels by 3 dBA; halving of the energy would result in a 3 dBA decrease.

Figure 3 shows the relationship of various noise levels to commonly experienced noise events.

Average noise levels over a period of minutes or hours are usually expressed as dBA $L_{eq,}$ or the equivalent noise level for that period of time. For example, $L_{eq(3)}$ would represent a 3-hour average. When no period is specified, a one-hour average is assumed. Instantaneous and short-duration noise events are often described using the L_{max} noise descriptor, which is the RMS (root mean squared) maximum level of a noise source or environment measured on a sound level meter, during a designated time interval.

It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA; that a change of 5 dBA is readily perceptible, and that an increase (decrease) of 10 dBA sounds twice (half) as loud. This definition is recommended by the California Department of Transportation's Traffic Noise Analysis Protocol for New Highway and Reconstruction Projects (2013a).

Table 1

Definitions of Acoustical Terms

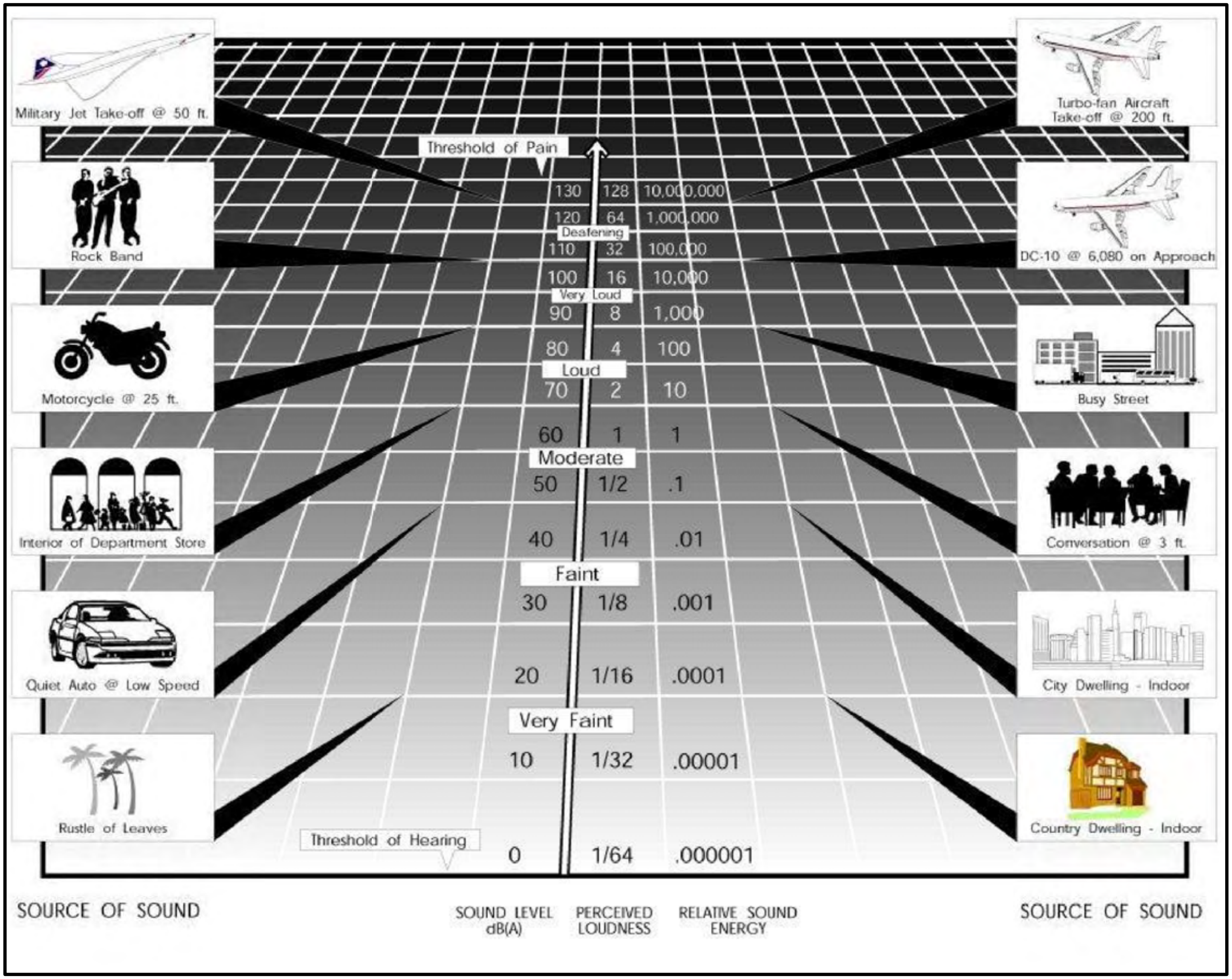
Term	Definition
Ambient Noise Level	The all-encompassing noise environment associated with a given environment, at a specified time, usually a composite of sound from many sources, at many directions, near and far, in which usually no particular sound is dominant.
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear.
CNEL	Community Noise Equivalent Level. CNEL is a weighted 24-hour noise level that is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours.
Decibel, dB	A logarithmic unit of noise level measurement that relates the energy of a noise source to that of a constant reference level; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
DNL, Ldn	Day Night Level. The DNL, or Ldn is a weighted 24-hour noise level that is obtained by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the nighttime hours.
Equivalent Continuous Noise Level, L_{eq}	A level of steady state sound that in a stated time period, and a stated location, has the same A-weighted sound energy as the time-varying sound.
Fast/Slow Meter Response	The fast and slow meter responses are different settings on a sound level meter. The fast response setting takes a measurement every 100 milliseconds, while a slow setting takes one every second.
Frequency, Hertz	In a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., the number of cycles per second).
L_{02}, L_{08}, L_{50}, L_{90}	The A-weighted noise levels that are equaled or exceeded by a fluctuating sound level, 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period, respectively.
L_{max}, L_{min}	L_{max} is the RMS (root mean squared) maximum level of a noise source or environment measured on a sound level meter, during a designated time interval, using fast meter response. L_{min} is the minimum level.
Offensive/ Offending/ Intrusive Noise	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of sound depends on its amplitude, duration, frequency, and time of occurrence, and tonal information content as well as the prevailing ambient noise level.
Root Mean Square (RMS)	A measure of the magnitude of a varying noise source quantity. The name derives from the calculation of the square root of the mean of the squares of the values. It can be calculated from either a series of lone values or a continuous varying function.

Table 2

List of Acronyms

Term	Definition
ADT	Average Daily Traffic
ANSI	American National Standard Institute
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
D/E/N	Day / Evening / Night
dB	Decibel
dBA or dB(A)	Decibel "A-Weighted"
dBA/DD	Decibel per Double Distance
dBA L_{eq}	Average Noise Level over a Period of Time
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
L_{02},L_{08},L_{50},L_{90}	A-weighted Noise Levels at 2 percent, 8 percent, 50 percent, and 90 percent, respectively, of the time period
DNL	Day-Night Average Noise Level
$L_{eq(x)}$	Equivalent Noise Level for '"x" period of time
L_{eq}	Equivalent Noise Level
L_{max}	Maximum Level of Noise (measured using a sound level meter)
L_{min}	Minimum Level of Noise (measured using a sound level meter)
LOS C	Level of Service C
OPR	California Governor's Office of Planning and Research
PPV	Peak Particle Velocities
RCNM	Road Construction Noise Model
REMEL	Reference Energy Mean Emission Level
RMS	Root Mean Square

Figure 3
Common Noise Sources and Noise Levels



B. Vibration Fundamentals

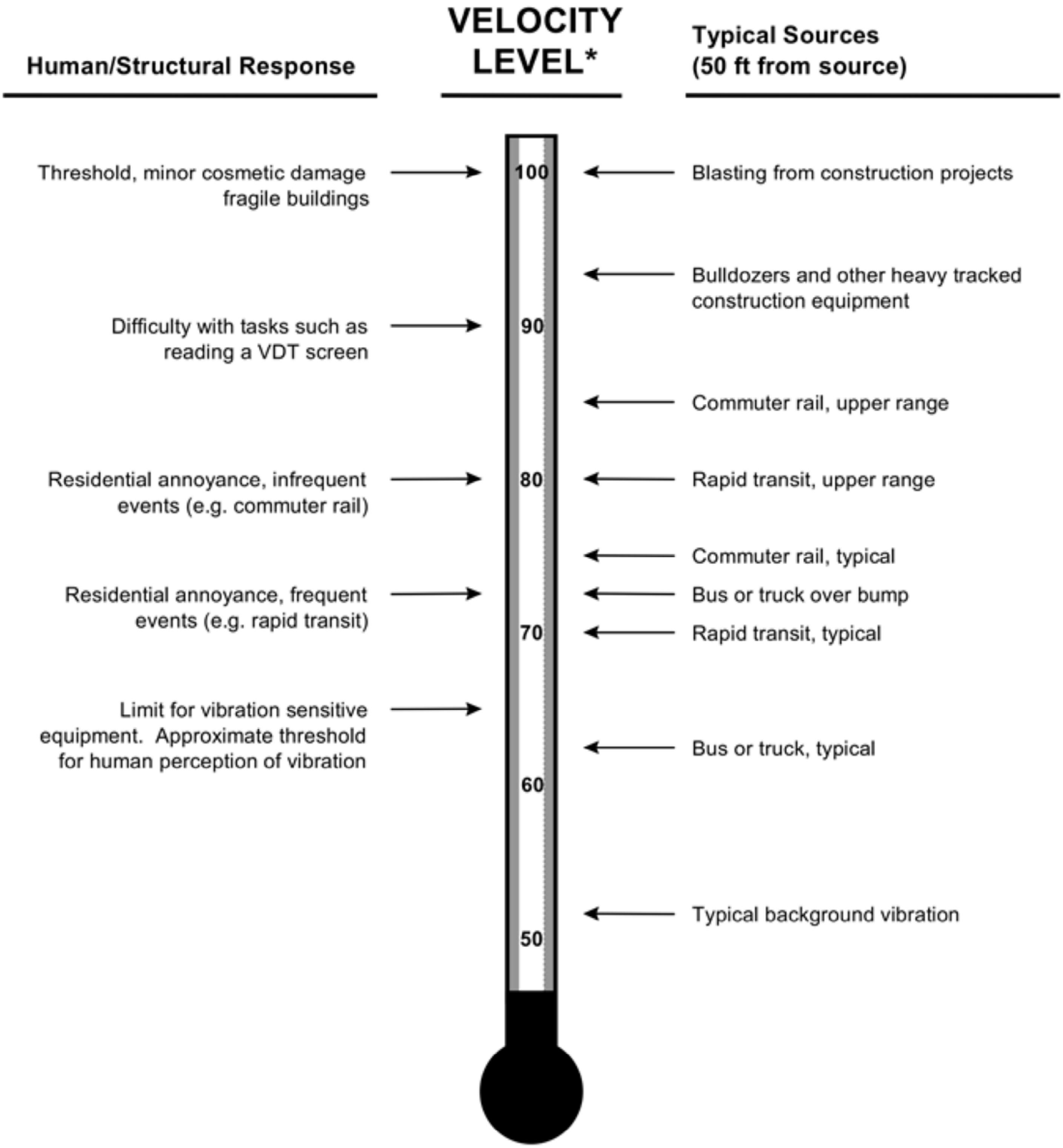
The way in which vibration is transmitted through the earth is called propagation. Propagation of earthborn vibrations is complicated and difficult to predict because of the endless variations in the soil through which waves travel. There are three main types of vibration propagation: surface, compression and shear waves. Surface waves, or Raleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. Compression waves, or P-waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. Shear waves, or S-waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or "side-to-side and perpendicular to the direction of propagation".

As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous peak of the vibration signal in inches per second. The RMS of a signal is the average of the squared amplitude of the signal in vibration decibels (VdB), ref one micro-inch per second. The abbreviation "VdB" for vibration decibels to reduce the potential for confusion with sound decibel.

PPV is appropriate for evaluating the potential of building damage and VdB is commonly used to evaluate human response. Decibel notation acts to compress the range of numbers required in measuring vibration. Similar to the noise descriptors, Leq and Lmax can be used to describe the average vibration and the maximum vibration level observed during a single vibration measurement interval. Figure 4 illustrates common vibration sources and the human and structural responses to ground-borne vibration. As shown in the figure, the threshold of perception for human response is approximately 65 VdB; however, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB. Vibration tolerance limits for sensitive instruments such as magnetic resonance imaging (MRI) or electron microscopes could be much lower than the human vibration perception threshold.

Figure 4
Common Vibration Sources and Velocity Levels



** RMS Vibration Velocity Level in dB relative to 10 $^{-6}$ inches/second*

Source: FRA, 2012. Federal Railroad Administration High-Speed Ground Transportation Noise and Vibration Impact Assessment. Office of Railroad Policy Development, Washington, D.C. DOT/FRA/ORD-12/15. September.

III. Existing Noise Environment

A. Existing Land Uses and Sensitive Receptors

The State of California defines sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, single and multiple family residential, including transient lodging, motels and hotel uses make up the majority of these areas.

The southern 3.53 acres of the project site is currently developed with Phase 1 of the proposed project. The northern 3.0 acres are currently vacant. The site topography gently slopes from the north-northeast to the south-southwest with approximately 20 feet of relief from north to south. Elevations range from 397 Mean Sea Level (MSL) in the northeastern corner of the site; to 375 MSL at the southern corner of the site.

Surrounding land uses include single family to the north, south and southeast, and a church and a charter school to the west.

B. Ambient Noise Measurements

An American National Standards Institute (ANSI Section SI4 1979, Type 1) Larson Davis model LxT sound level meter was used to document existing ambient noise levels. Four short-term (10 minute) noise measurements were taken near existing sensitive receptors near the project site on Monday April 29, 2019 between the hours of 2:19 PM and 4:17 PM. Measured ambient noise levels in the project area range between 44.8 to 53.6 dBA L_{eq}. Noise measurement locations are shown in Figure 5. Measurement output data is presented in Table 3. Noise meter data and field notes are included in Appendix A.

Table 3

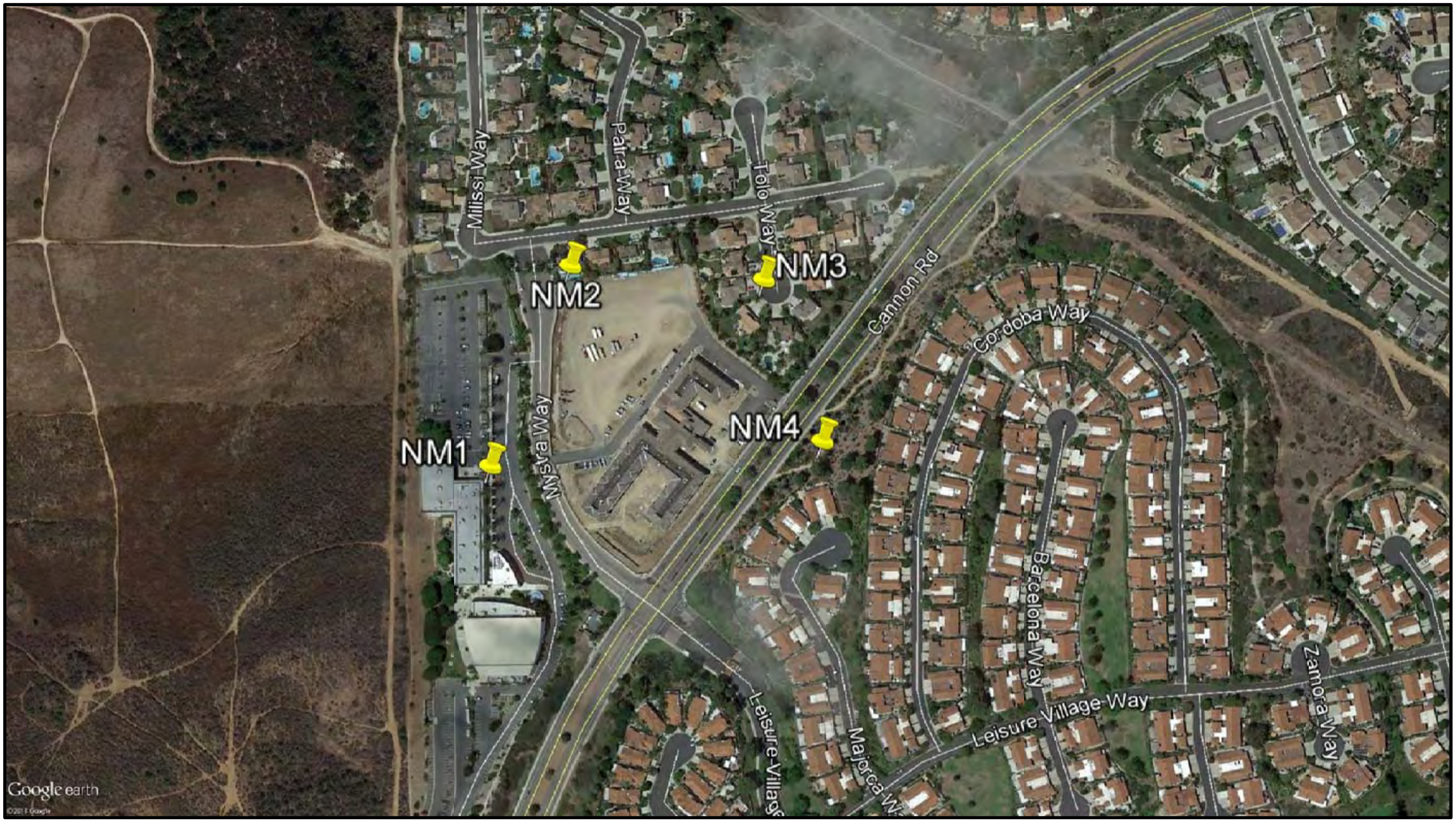
Noise Measurement Summary (dBA)[1, 2]

Daytime							
Measurement Location	Time Started	Duration	Leq	Lmax	L(2)	L(8)	L(25)
NM1		10 minutes					
NM2		10 minutes					
NM3		10 minutes					
NM4		10 minutes					

[1] See Figure 5 for noise measurement locations.

[2] Noise measurements were performed on April 29, 2019.

Figure 5
Noise Measurement Locations



NM = Noise Measurement Location
LTNM = Long-term Noise Measurement Location

IV. Regulatory Setting

A. Construction Noise and Groundborne Vibration

1. Construction Noise

The City of Oceanside Noise Element controls noise levels due to construction operations. It shall be unlawful for any person to operate construction equipment at any construction site, except as outlined in subsections (a-c) below:

(a) It should be unlawful for any person within any residential zone or 500' therefrom to operate any pile driver, power shovel, pneumatic, power hoist, or other construction equipment between 8 PM and 7 AM generating an ambient noise level of 50 dBA at any property line, unless an emergency exists. (b) It shall be unlawful for any person to operate any construction equipment at a level in excess of 85 dBA at 100 feet from the source. (c) It should be unlawful for any person to engage in construction activities between 6 PM and 7 AM when such activities exceed the ambient noise level by 5 dBA. A special permit may be granted by the Director of Public Works if extenuating circumstances exist.

2. Vibration

The City of has not yet adopted vibration criteria. The California Department of Transportation (Caltrans) has published one of the seminal works for the analysis of groundborne noise and vibration relating to transportation- and construction-induced vibrations and although the project is not subject to these regulations, it serves as useful tools to evaluate vibration impacts. These guidelines recommend that a standard of 0.2 inches per section (in/sec) PPV not be exceeded for the protection of normal residential buildings (Caltrans 2013b). A PPV of 0.2 inches per second is also the vibration level at which vibration may become annoying. Table 4 shows typical human reactions to various levels of PPV as well as the effect of PPV on buildings.

B. Traffic Noise Impacts

For noise sensitive residential land uses, the City has adopted a policy which has established a “normally acceptable” exterior noise level goal of 65 dBA CNEL for the outdoor areas and the State of California land use compatibility guidelines indicate that exterior noise levels up to 70 dB Ldn or CNEL are considered acceptable for nursing homes (OPR, 2003). Additionally, an interior noise level of 45 dBA CNEL is required by the Calfiornia Building Code Title 24 (Title 24, CCR, Section 1207). Interior noise levels should be mitigated to a maximum of 45 dBA CNEL in all habitable rooms when the exterior of the residence are exposed to levels of 60 dBA CNEL or more. If windows and doors are required to be closed to meet the interior noise standard, then mechanical ventilation shall be provided per City requirements.

C. Operational Noise Impacts

1. Exterior Noise Standards

Fixed sources and operational noise standards are governed by the City of Oceanside Noise Ordinance Section 38.12. Except for exempted activities and sounds as provided in this chapter or exempted properties as referenced in Section 38.15, it shall be unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the property in the applicable base district zone on which the sound is produced exceeds the applicable limits set forth below in Table 5.

The City of Oceanside General Plan Noise Element (June 2002) also includes a policy stating that “machinery, circulation devices, fans, and other such equipment should not be permitted to operate when a noise level is created at the property line exceeding 5 dB above the ambient noise level”.

In addition to the sound level limits established above, there are established sound level limits for PD (planned development) base district zones. For any residential land use within a PD zone, the sound level limit is that limit which would be otherwise applicable in the residential district zone (RE, RS, RM, RH or RT) corresponding to density of the residential development in that PD zone. For any nonresidential land use within a PD zone, the sound level limit is that limit corresponding to the C (commercial) or I (industrial) zone which would be applicable to that use if not subject to the PD zone. For the purposes of this section, a land use shall be that use shown on a duly approved planned development plan or specific plan. When property lines form the joint boundary of two (2) base district zones, the sound level limit shall be the arithmetic mean of the limit applicable to each of the two (2) zones. Although the site is zoned (CL) Limited Commercial, the proposed use is mostly residential in nature, so the standards for residential land uses are applicable.

Table 4

Typical Human Reaction and Effect on Buildings due to Groundborne Vibration [1]

Vibration Level Peak Particle Velocity (PPV)	Human Reaction	Effect on Buildings
0.006–0.019 in/sec	Threshold of perception, possibility of intrusion	Vibrations unlikely to cause damage of any type
0.08 in/sec	Vibrations readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
0.10 in/sec	Level at which continuous vibration begins to annoy people	Virtually no risk of “architectural” (i.e., not structural) damage to normal buildings
0.20 in/sec	Vibrations annoying to people in buildings	Threshold at which there is a risk to “architectural” damage to normal dwelling – houses with plastered walls and ceilings
0.4–0.6 in/sec	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause “architectural” damage and possibly minor structural damage. At 0.5 PPV possible cosmetic structural damage to buildings built of reinforced concrete, steel or timber.

[1] Source: California Department of Transportation(b). Transportation and Construction Vibration Guidance Manual, Chapter 6 Tables 5 and 12, September 2013.

Table 5

Operational Noise Level Limits[1]

Base District Zone	7:00 AM to 9:59 PM	10:00 PM to 6:59 PM
(1) Residential Districts:		
RE (Residential Estate)	50	45
RS (Single-Family)	50	45
RM (Medium Density)	50	45
RH (High Density)	55	50
RT (Residential Tourist)	55	50
(2) C (Commercial)	65	60
(3) I (Industrial)	70	65
(4) D (Downtown)	65	55
(5) A (Agricultural)	50	45
(6) OS (Open Space)	50	45

[1] City of Oceanside Noise Ordinance Section 38.12.

V. Analytical Methodology and Impact Analysis

A. Methodology

1. Construction Noise

Construction noise associated with each phase of construction was calculated utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. Modeling parameters and output are provided in Appendix B.

2. SoundPLAN

The SoundPLAN noise modeling software was utilized to model traffic noise levels associated with Cannon Road on the project site. This three-dimensional model takes into consideration the existing and proposed topography, existing structures and barriers and ground type. The SoundPLAN software utilizes algorithms (based on the inverse square law) to calculate noise level projections. The software allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations.

The critical model input parameters, which determine the projected vehicular traffic noise levels, include vehicle travel speeds, the percentages of automobiles, medium trucks and heavy trucks in the roadway volume, the site conditions. Per the City of Oceanside General Plan Circulation Element (2012), Cannon Road is expected to handle 29,100 average daily trips. The loudest noise levels associated with vehicle traffic occurs when the maximum amount of cars pass at the greatest speed which usually corresponds to Level of Service Conditions (C), or about 75% of buildout capacity. Cannon Road was molded at a level of service C and a speed of 40 miles per hour. A standard City traffic mix of 96/2/2 was utilized. SoundPLAN data is provided in Appendix C.

B. Impact Analysis and Findings

1. Construction Noise Impacts

The construction activities for the proposed project are anticipated to include fine grading, building construction, paving and architectural coating. Noise levels expected to occur with each piece of equipment are presented in Table 6. Construction noise associated with each phase of construction was calculated utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. As shown in Table 7, construction noise would reach up to 80.1 dBA at a distance of 100 feet and will not exceed the City of Oceanside 85 dBA standard at 100 feet from the source. Construction noise impacts would be less than significant. No mitigation measures are required. The construction noise worksheet is included in Appendix B.

Table 6

Typical Construction Equipment Noise Levels[1]

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 feet)	Suggested Maximum Sound Levels for Analysis (dBA at 50 feet)
Rock Drills	83-99	96
Jack Hammers	75-85	82
Pneumatic Tools	78-88	85
Pumps	74-84	80
Dozers	77-90	85
Scrappers	83-91	87
Haul Trucks	83-94	88
Cranes	79-86	82
Portable Generators	71-87	80
Rollers	75-82	80
Tractors	77-82	80
Front-End Loaders	77-90	86
Hydraulic Excavators	81-90	86
Graders	79-89	86
Air Compressors	76-89	86
Trucks	81-87	86

[1] Source: Bolt, Beranek & Newman; Noise Control for Buildings and Manufacturing Plants, 1987.

Table 7

Project Construction Noise

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1, 2]	Distance	Item Usage Percent	Receptor Item Leq, dBA
Fine Grading					
Graders	1	85	100	40	75.0
Rubber Tired Dozers	1	85	100	40	75.0
Tractors/Loaders/Backhoes	2	80	100	40	73.0
				Fine Grading Cumulative	**79.2**
Building Construction					
Cranes	1	83	100	16	69.0
Forklifts	2	64	100	50	58.0
Generator Sets	1	82	100	40	72.0
Welders	3	64	100	40	58.8
Tractors/Loaders/Backhoes	1	80	100	40	70.0
				Building Construction Cumulative	**72.7**
Paving					
Cement and Mortar Mixers	1	85	100	40	75.0
Pavers	1	85	100	50	76.0
Paving Equipment	1	85	100	20	72.0
Tractors/Loaders/Backhoes	1	80	100	40	70.0
Rollers	1	85	100	20	72.0
				Paving Cumulative	**80.1**
Architectural Coating					
Air Compressors	1	80	100	40	70.0
				Architectural Coating Cumulative	**70.0**

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018).

(2) Source: https://www.google.com/url?q=http://www.noisetesting.info/blog/warehouse-forklift-workplace-noise-levels/&sa=D&source=hangouts&ust=1545259247311000&usg=AFQjCNHFcKKoEKUjv5VZMOtw_KO977Em1A

2. Groundborne Vibration Impacts

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Typically, particle velocity or acceleration (measured in gravities) is used to describe vibration in context of potential structural damage. Table 8 shows the peak particle velocities (PPV) of some common construction equipment and Table 4 shows typical human reactions to various levels of PPV as well as the effect of PPV on buildings.

As shown in Table 4, the threshold at which there may be a risk of architectural damage to normal houses with plastered walls and ceilings is 0.20 PPV in/second. The nearest existing sensitive receptors are single family residential homes located approximately 30 feet to the north and east of the project boundary. As shown in Table 8, a vibratory roller can generate 0.21 PPV at a distance of 25 feet, and a large bulldozer can generate groundborne vibration of up to 0.089 PPV at 25 feet. At 30 feet, groundborne vibration levels may reach up to may reach up to 0.172 PPV with use of a vibratory roller, and up to 0.073 PPV with use of a larger bulldozer. Operation of vibratory equipment on the project site is not expected to result in damage to existing single family homes. Impacts related to groundborne vibration would be less than significant. No mitigation is required. Groundborne vibration worksheets are included in Appendix D.

Table 8

Vibration Source Levels for Construction Equipment[1]

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level LV (dVB) at 25 feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(Slurry wall)	0.017 in rock	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

[1] Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.

3. Traffic Noise Impacts to the Proposed Project

As discussed previously, the SoundPLAN noise model was utilized to calculate traffic noise levels at the proposed project. As shown on Figures 6 and 7, exterior noise levels, due to buildout traffic volumes on Cannon Road, are expected to reach up to 65 dBA CNEL at the closest part of the Phase 1 building and will not exceed City of Oceanside criteria for residential land uses (65 dBA CNEL).

The interior noise level is the difference between the projected exterior noise level at the structure's façade and the noise reduction provided by the structure itself. Typical building construction provides 20 dB of exterior to interior noise reduction, with the windows closed (FHWA 2011). Considering that exterior noise levels due to traffic noise, may reach up to 65 dBA CNEL, interior noise levels should not exceed 45 dBA CNEL.

Future traffic noise impacts related to the proposed project would be less than significant. No mitigation is required.

4. Project Generated Traffic Noise Impacts

Project generated average daily trips (ADTs) on affected roadways were calculated and assigned to affected road segments using Existing Traffic Volume and Project Buildout Trip Assignment exhibits provided in the traffic study prepared for the project (Rick Engineering 2018). Trip generation and distribution were slightly modified using the trip generation rate identified in the traffic study to include four (4) additional vehicle trips per an updated project description that includes one (1) additional residential unit. Existing, and Project Roadway Parameters are shown in Table 9.

Modeling was conducted to compare existing and existing plus project noise levels at a distance of 50 feet from the centerline of affected road segments. Existing and Existing Plus Project ADTs are shown in Table 10. Modeling data sheets are included as Appendix E. In no case would the proposed project result in an increase of 5 dB or greater along affected road segments. The project would not generate a sufficient amount of vehicle trips to result in a noticeable increase in ambient noise levels. This impact is less than significant. No mitigation is required.

5. Project Operational Noise Impacts

In general, senior living homes are a quiet land use and noise from the facility would be considered compatible with the surrounding residences, school and church. Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale. However, the instantaneous sound levels generated by a car door slamming and engine starting up may be an annoyance to adjacent sensitive receptors. The estimated maximum noise levels associated with parking lot activities typically range from 60-65 dBA and are short term. It should be noted that parking lot noise are instantaneous noise levels compared to noise standards, which are averaged over time. As a result, actual noise levels over time resulting from parking lot activities would be far lower. Therefore, the proposed parking would not expose nearby sensitive receptors to substantial noise levels and impacts will be less than significant.

Typically, mechanical equipment (HVAC) noise is 50-55 dBA at 50 feet from the source. HVAC units would be included on the roof of the proposed office building and would be placed within roof wells and shielded which would further reduce the noise. The noise from the HVAC units would meet the City's Noise Standards at the nearest existing and proposed residents. Additionally, mechanical ventilation system will cycle on and off throughout the day.

Residential Activities Noise generated from residential uses is generally from sources such as amplified music, barking dogs, and landscape maintenance equipment that may be disturbing to other residents. Section 38.16 of the Oceanside Municipal Code prohibits nuisance noise at any time which causes discomfort or annoyance to reasonable persons of normal sensitivity. Compliance with the noise ordinance would limit exposure to excessive nuisance noise. The Oceanside Police Department enforces the nuisance noise provisions of the noise ordinance. Additionally, nuisance noises would be different from each other in kind, duration, and location, so that the overall effects would be separate and in most cases would not affect the receptors at the same time. Instances of nuisance noise would be addressed on an individual case basis by the Oceanside Police Department. Therefore, nuisance noise from the proposed residences would be less than significant.

The project site would be landscaped; therefore, regular maintenance would be required. Maintenance activities would include the use of mowers, trimmers, and blowers, which would result in intermittent short-term temporary noise increases. Maintenance activities are permitted uses and would be subject to the daytime one-hour Leq noise limits in residential neighborhoods. Maintenance equipment would not be operating at any one location for more than a few minutes and it is not likely that the equipment would be operating all at the same time. Due to the limited amount of time the equipment would be operating in one location. Therefore, operation of maintenance equipment would generally not exceed the hourly noise level limit at adjacent residential receptors and no impacts are anticipated. Operational noise impacts would be less than significant. Mitigation is not required.

Figure 6

Future Traffic Noise Levels

Signs and symbols

Site Plan

Receiver

Receiver at building

Emission line

1 : 150

0 37.5 75 150 225 300 feet

Roma Environmental

Figure 7

Future Traffic Noise Contours (CNEL)

Signs and symbols

- Site Plan
- Emission line

Levels in dB(A)

	<= 45
	45 - 50
	50 - 55
	55 - 60
	60 - 65
	> 65

1 : 150

0 37.5 75 150 225 300 feet

Roma Environmental

Table 9

Average Daily Traffic Volumes and Roadway Parameters

Roadway	Segment	Average Daily Traffic Volumes		Posted Travel Speeds (MPH)	Site Conditions
		Existing	Existing Plus Project		
Cannon Road	North and South of Project Site	4,583	5,310	45	Hard
Mystra Way	West of Cannon Road	1,762	2,073	30	Hard

[1] Average daily traffic volumes obtained from the Ocean Hills Senior Living Phase 2 Facility Focused Traffic Impact Study (November 2, 2018) (February 2018).

Table 10

Comparison of Existing and Existing Plus Project Noise Levels Along Roadways(dBA CNEL)[1]

Roadway	Segment	CNEL at 50 Feet dBA		Change in Noise Level Existing and Existing Plus Project
		Existing Without Project	Existing Plus Project	
Cannon Road	North and South of Project Site	67.24	67.88	0.64
Mystra Way	West of Cannon Road	54.97	55.67	0.70

[1] Exterior noise levels calculated 5 feet above pad elevation, perpendicular to subject roadway.

VI. References

California Department of Transportation

2013a Technical Noise Supplement, September.

2013b Transportation Related Earthborne Vibrations (Caltrans Experiences), Technical Advisory, Vibration TAV-02-01-R9601. February 20.

Federal Highway Administration

2011 Highway Traffic Noise Analysis and Abatement Guidance.

Federal Transit Administration

2018 Transit Noise and Vibration Impact Assessment Manual.

Harris, Cyril M.

1991 Handbook of Acoustical Measurement and Noise Control. *"Acoustical Society of America.* Woodbury, N.Y.

Oceanside

\- Municipal Code, as updated through August 2018.

2002 General Plan Noise Element.

2012 General Plan Circulation Element.

Rick Engineering

2018 Ocean Hills Senior Living Phase 2 Facility Focused Traffic Impact Study. November 2.

APPENDIX A

Larson Davis LXT Noise Measurement Data

Noise Measurement Field Data

Project Name: Ocean Hills, City of Oceanside **Date:** 29 April 2019

Project #: 19-03

Noise Measurement #: NM1 **Technician:** Ian Gallagher

Nearest Address or Cross Street: New Venture Christian Preschool, 4010 Mystra Drive, Oceanside, California 92056

Site Description (Type of Existing Land Use and any other notable features): Concrete buildings and parking lot

Adjacent uses are preschool immediately W and church immediately SW with open terrain beyond. N, E & S mostly single family residential, gated communities.

Weather: 70% cloudy with occasional light rain **Settings:** $\boxed{\text{SLOW}}$ FAST

Temperature: 65 deg F **Wind:** 10-15 mph **Humidity:** 68% **Terrain:** Flat

Start Time: 3:43 PM **End Time:** 3:53 PM **Run Time:** 10 minutes

Leq: 50 dB

Lmax 63.2 dB

L2 59.5 dB

L8 54.2 dB

L25 48.6 dB

L50 45.8 dB

Primary Noise Source: Vehicles passing along Mystra Drive, a total of 10 vehicles passed along Drive during 10 minute sample.

Secondary Noise Sources: Preschool yard ambiance, children playing, adults conversating, wind rustling palm tree leaves in wind, overhead distant propellor and jet aircraft.

NOISE METER: SoundTrack LXT Class 1

MAKE: Larson Davis

MODEL: LXT1

SERIAL NUMBER: 3099

FACTORY CALIBRATION DATE: 6/23/2017

FIELD CALIBRATION DATE: 4/29/2019

CALIBRATOR: Larson Davis CAL250

MAKE: Larson Davis

MODEL: Cal 250

SERIAL NUMBER: 2733

FACTORY CALIBRATION DATE: 6/19/2017

Noise Measurement Field Data

PHOTOS:

NM1 looking SW towards New Venture Preschool offices.
Microphone about 22' from building.

NM1 looking East across school parking lot and Mystra Dr
towards Project Site.

Summary	
File Name on Meter	LxT_Data.229
File Name on PC	SLM_0003099_LxT_Data_229.00.ldbin
Serial Number	0003099
Model	SoundTrack LxT®
Firmware Version	2.301
User	Ian Edward Gallagher
Location	NM1 Roma Env 19-03 New Venture Christian School 33° 9'55.09"N 117°16'12.32"W
Job Description	10 minute noise measurement
Note	(1 x 10 minutes)
Measurement	
Start	2019-04-29 15:43:05
Stop	2019-04-29 15:53:05
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2019-04-29 15:31:54
Post Calibration	None
Calibration Deviation	---
Overall Settings	
RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Low
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	Z Weighting
OBA Max Spectrum	Bin Max
Overload	122.7 dB
Results	
LAeq	50.0 dB
LAE	77.8 dB

EA	6.696	µPa²h	
EA8	321.384	µPa²h	
EA40	1.607	mPa²h	
LZpeak (max)	2019-04-29 15:45:58		97.9 dB
LASmax	2019-04-29 15:46:46		63.2 dB
LASmin	2019-04-29 15:52:36		41.1 dB
SEA	-99.9	dB	
LCeq	65.6	dB	
LAeq	50.0	dB	
LCeq - LAeq	15.5	dB	
LAIeq	52.4	dB	
LAeq	50.0	dB	
LAIeq - LAeq	2.3	dB	
Leq	50.0		
LS(max)	63.2	2019/04/29 15:46:46	
LS(min)	41.1	2019/04/29 15:52:36	
LPeak(max)	97.9	2019/04/29 15:45:58	
Statistics			
LAS2.00	59.5	dB	
LAS8.00	54.2	dB	
LAS25.00	48.6	dB	
LAS50.00	45.8	dB	
LAS66.60	45.0	dB	
LAS90.00	43.2	dB	

Noise Measurement Field Data

Project Name: Ocean Hills, City of Oceanside **Date:** 29 April 2019

Project #: 19-03

Noise Measurement #: NM2 **Technician:** Ian Gallagher

Nearest Address or Cross Street: Mystray Drive and Pirgos Way

Site Description (Type of Existing Land Use and any other notable features): On-site uses Classical Acadamy Vista Charter School w/ open graded area..

Adjacent uses are preschool immediately W and church immediately SW with open terrain beyond. N, E & S mostly single family residential, gated communities.

Weather: 70% cloudy with occasional light rain **Settings:** $\boxed{\text{SLOW}}$ FAST

Temperature: 65 deg F **Wind:** 10-15 mph **Humidity:** 68% **Terrain:** Flat

Start Time: 3:04 PM **End Time:** 3:14 PM **Run Time:** 10 minutes

Leq: 47.2 dB **Primary Noise Source:** Vehicles passing along Mystra Drive, a total of 3 vehicles & 1 Fed Ex van passed along Drive during 10 minute sample.

Lmax 58.7 dB

L2 55.3 dB **Secondary Noise Sources:** School yard ambiance, children playing, bird song, palm tree leaves rustling in wind, overhead distant propellor and jet aircraft.

L8 52.2 dB

L25 45.9 dB

L50 43.8 dB

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	6/23/2017	**FACTORY CALIBRATION DATE:**	6/19/2017
FIELD CALIBRATION DATE:	4/29/2019		

Noise Measurement Field Data

PHOTOS:

NM2 looking SE across graded land towards the project site.

NM2 looking NW across Mystra Drive towrds vehicle entrance
& exit way to Seagate Terrace gated community.
Wall on either side of gate 5'6" tall, concrete block, painted white.

Summary	
File Name on Meter	LxT_Data.228
File Name on PC	SLM_0003099_LxT_Data_228.00.ldbin
Serial Number	0003099
Model	SoundTrack LxT®
Firmware Version	2.301
User	Ian Edward Gallagher
Location	NM2 Roma Env 19-03 33° 9'59.54"N 117°16'10.31"W
Job Description	10 minute noise measurement
Note	(1 x 10 minutes)
Measurement	
Description	
Start	2019-04-29 15:04:40
Stop	2019-04-29 15:14:40
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2019-04-29 14:45:23
Post Calibration	None
Calibration Deviation	---
Overall Settings	
RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Low
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	Z Weighting
OBA Max Spectrum	Bin Max
Overload	122.7 dB
Results	
L_{Aeq}	47.2 dB

LAE	75.0	dB	
EA	3.526	µPa²h	
EA8	169.266	µPa²h	
EA40	846.329	µPa²h	
LZpeak (max)	2019-04-29 15:10:48		98.4
LASmax	2019-04-29 15:10:58		58.7
LASmin	2019-04-29 15:08:31		39.3
SEA	-99.9	dB	
LCeq	64.7	dB	
LAeq	47.2	dB	
LCeq - LAeq	17.5	dB	
LAIeq	48.7	dB	
LAeq	47.2	dB	
LAIeq - LAeq	1.4	dB	
Leq	47.2		
LS(max)	58.7	2019/04/29 15:10:58	
LS(min)	39.3	2019/04/29 15:08:31	
LPeak(max)	98.4	2019/04/29 15:10:48	
Statistics			
LAS2.00	55.3	dB	
LAS8.00	52.2	dB	
LAS25.00	45.9	dB	
LAS50.00	43.8	dB	
LAS66.60	42.7	dB	
LAS90.00	40.9	dB	

Noise Measurement Field Data

Project Name: Ocean Hills, City of Oceanside **Date:** 29 April 2019

Project #: 19-03

Noise Measurement #: NM3 **Technician:** Ian Gallagher

Nearest Address or Cross Street: 4990 Tolo Way, Oceanside, California

Site Description (Type of Existing Land Use and any other notable features): Single family residential cul-de-sac

N, E & S mostly single family residential, gated communities.

Weather: 90% cloudy with occasional light rain **Settings:** SLOW FAST

Temperature: 64 deg F **Wind:** 10-15 mph **Humidity:** 68% **Terrain:** Flat

Start Time: 4:07 PM **End Time:** 4:17 PM **Run Time:** 10 minutes

Leq: 44.8 dB **Primary Noise Source:** Residential vehicle leaves driveway 4977 Tolo Way at 4:14PM

Lmax 67.2 dB

L2 53.1 dB **Secondary Noise Sources:** Bird song, palm tree leaves rustling in wind, overhead jet and propellor aircraft.

L8 50.2 dB

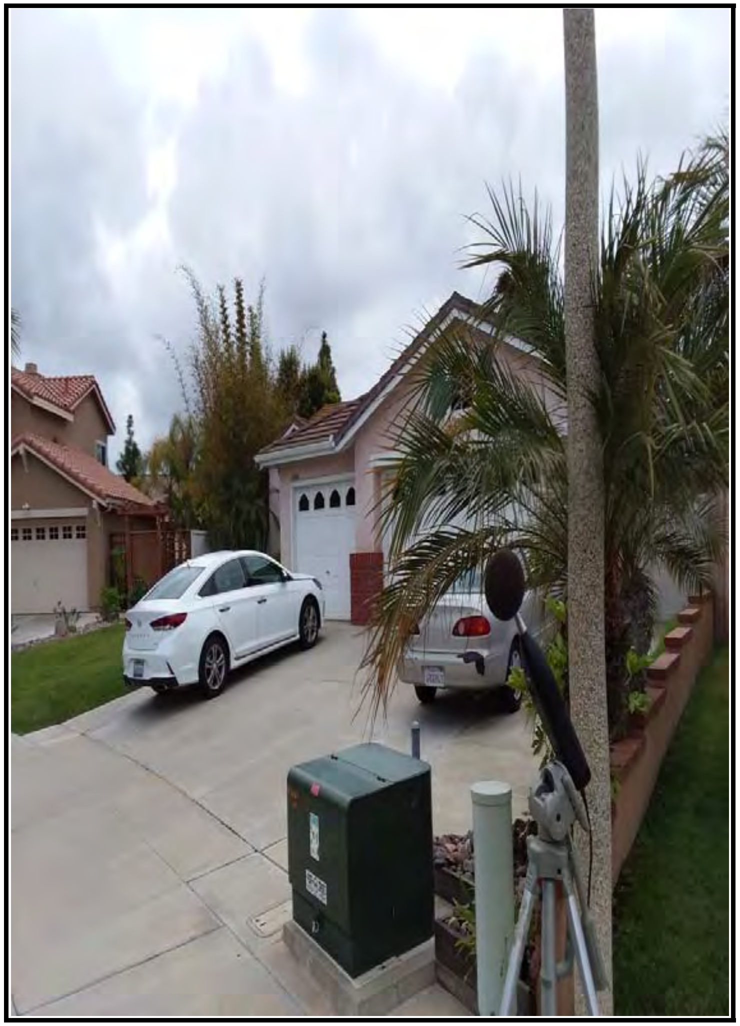
L25 43.8 dB

L50 41.6 dB

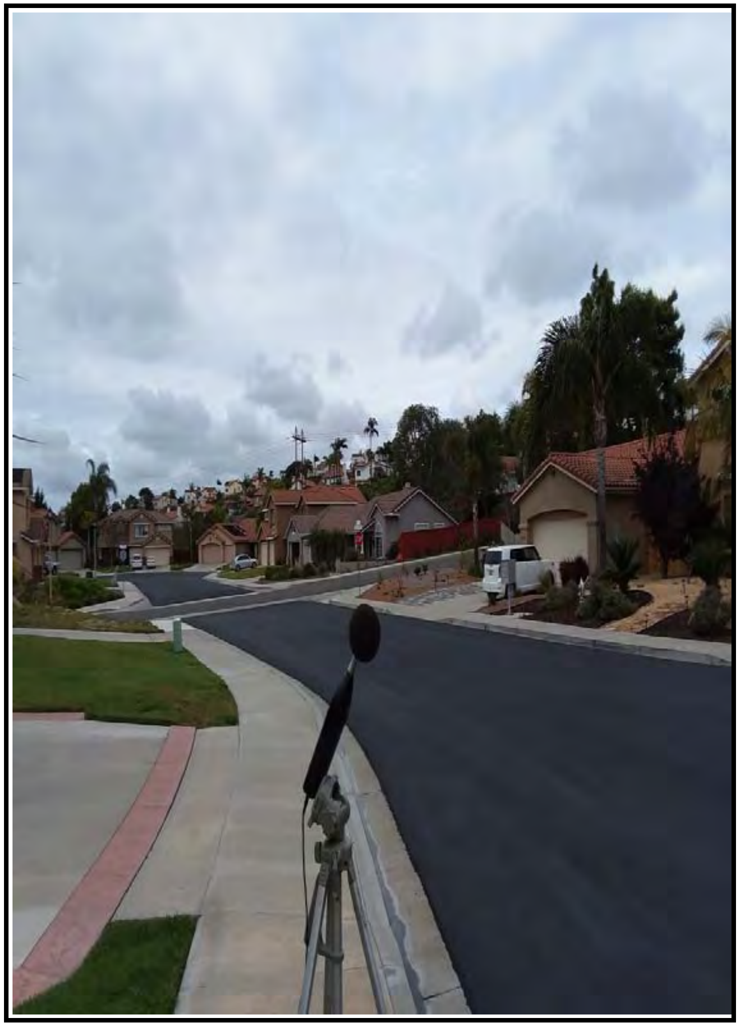
NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	6/23/2017	**FACTORY CALIBRATION DATE:**	6/19/2017
FIELD CALIBRATION DATE:	4/29/2019		

Noise Measurement Field Data

PHOTOS:



NM3 looking SW at single family residence 4984 Tolo Way.
Oceanside, California



NM3 looking North up Tolo Way towards Pirgos Way
intersection.

Summary	
File Name on Meter	LxT_Data.230
File Name on PC	SLM_0003099_LxT_Data_230.00.ldbin
Serial Number	0003099
Model	SoundTrack LxT®
Firmware Version	2.301
User	Ian Edward Gallagher
	NM3 Roma Env 19-03 4990 Tolo Way, Ocenaside
Location	33° 9'59.94"N 117°16'4.74"W
Job Description	10 minute noise measurement
Note	(1 x 10 minutes)
Measurement	
Description	
Start	2019-04-29 16:07:19
Stop	2019-04-29 16:17:19
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2019-04-29 16:07:09
Post Calibration	None
Calibration Deviation	---
Overall Settings	
RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Low
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	Z Weighting
OBA Max Spectrum	Bin Max
Overload	122.6 dB
Under Range Peak	78.9 dB

Under Range Limit		**25.4** dB	
Noise Floor		16.2 dB	
Results			
LAeq		44.8 dB	
LAE		72.6 dB	
EA		2.023 µPa²h	
EA8		97.084 µPa²h	
EA40		485.420 µPa²h	
LZpeak (max)	2019-04-29 16:11:10		89.7 dB
LASmax	2019-04-29 16:07:19		67.2 dB
LASmin	2019-04-29 16:15:33		36.4 dB
SEA		-99.9 dB	
LCeq		57.0 dB	
LAeq		44.8 dB	
LCeq - LAeq		12.2 dB	
LAIeq		53.9 dB	
LAeq		44.8 dB	
LAIeq - LAeq		9.1 dB	
Leq		44.8	57.0
LS(max)		67.2	2019/04/29 16:07:19
LS(min)		36.4	2019/04/29 16:15:33
LPeak(max)		89.7	2019/04/29 16:11:10
# Overloads		0	
Overload Duration		0.0 s	
# OBA Overloads		0	
OBA Overload Duration		0.0 s	
Statistics			
LAS2.00		53.1 dB	
LAS8.00		50.2 dB	
LAS25.00		43.8 dB	
LAS50.00		41.6 dB	
LAS66.60		40.4 dB	
LAS90.00		38.6 dB	

Noise Measurement Field Data

Project Name: Ocean Hills, City of Oceanside **Date:** 29 April 2019

Project #: 19-03

Noise Measurement #: NM4 **Technician:** Ian Gallagher

Nearest Address or Cross Street: 180 yards NE of Cannon Rd & Mystra Dr intersection. Location: 33° 9'55.46"N 117°16'3.11"W

Site Description (Type of Existing Land Use and any other notable features): Hillside next to residential neighborhood

N, E & S mostly single family residential, gated communities. Project site to west.

Weather: 70% cloudy with occasional light rain **Settings:** $\boxed{\text{SLOW}}$ FAST

Temperature: 64 deg F **Wind:** 10-15 mph **Humidity:** 68% **Terrain:** Flat

Start Time: 2:18 PM **End Time:** 2:28 PM **Run Time:** 10 minutes

Leq: 53.6 dB

Lmax 61.9 dB

L2 60.0 dB

L8 58.3 dB

L25 55.7 dB

L50 49.6 dB

Primary Noise Source: Vehicles passing along Cannon Road, a total of 51 vehicles passed during 10 minute noise measurement.

Secondary Noise Sources: Bird song, palm tree leaves rustling in wind, overhead jet and propellor aircraft.

NOISE METER: SoundTrack LXT Class 1 **CALIBRATOR:** Larson Davis CAL250

MAKE: Larson Davis **MAKE:** Larson Davis

MODEL: LXT1 **MODEL:** Cal 250

SERIAL NUMBER: 3099 **SERIAL NUMBER:** 2733

FACTORY CALIBRATION DATE: 6/23/2017 **FACTORY CALIBRATION DATE:** 6/19/2017

FIELD CALIBRATION DATE: 4/29/2019

Noise Measurement Field Data

PHOTOS:

NM4 looking SE towards gated residence, wall about 5'6" tall. concrete block, painted white.

NM4 looking W across Cannon Road towards project site

Summary	
File Name on Meter	LxT_Data.226
File Name on PC	SLM_0003099_LxT_Data_226.00.ldbin
Serial Number	0003099
Model	SoundTrack LxT®
Firmware Version	2.301
User	Ian Edward Gallagher
Location	NM4 Roma Env 19-03 33° 9'55.46"N 117°16'3.11"W
Job Description	10 minute noise measurement
Note	(1 x 10 minutes)
Measurement	
Description	
Start	2019-04-29 14:18:39
Stop	2019-04-29 14:28:39
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre Calibration	2019-04-29 14:15:57
Post Calibration	None
Calibration Deviation	---
Overall Settings	
RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Low
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	Z Weighting
OBA Max Spectrum	Bin Max
Overload	122.6 dB
Under Range Peak	78.8
Under Range Limit	**25.4**

Noise Floor	16.1		
Results			
LAeq	53.6	dB	
LAE	81.4	dB	
EA	15.320	µPa²h	
EA8	735.337	µPa²h	
EA40	3.677	mPa²h	
LZpeak (max)	2019-04-29 14:22:51		98.4
LASmax	2019-04-29 14:25:59		61.9
LASmin	2019-04-29 14:26:46		41.3
SEA	-99.9	dB	
LCeq	61.9	dB	
LAeq	53.6	dB	
LCeq - LAeq	8.2	dB	
LAIeq	55.3	dB	
LAeq	53.6	dB	
LAIeq - LAeq	1.7	dB	
Leq	53.6		
LS(max)	61.9	2019/04/29 14:25:59	
LS(min)	41.3	2019/04/29 14:26:46	
LPeak(max)	98.4	2019/04/29 14:22:51	
Statistics			
LAS2.00	60.0	dB	
LAS8.00	58.3	dB	
LAS25.00	55.7	dB	
LAS50.00	49.6	dB	
LAS66.60	47.0	dB	
LAS90.00	43.4	dB	

APPENDIX B

Construction Noise Worksheet

A	B	C	D	E	F	G	H	I	J
onstruction Phase Equipment Ite	# of Items	Item Lmax at 50 feet, dBA[1, 2]	Distance	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA
Fine Grading									
Graders	1	85	100	40	0.40	-6.0	-4.0	91.0	75.0
Rubber Tired Dozers	1	85	100	40	0.40	-6.0	-4.0	91.0	75.0
Tractors/Loaders/Backhoes	2	80	100	40	0.80	-6.0	-1.0	86.0	73.0
							Log Sum		79.2
Building Construction									
Cranes	1	83	100	16	0.16	-6.0	-8.0	89.0	69.0
Forklifts	2	64	100	50	1.00	-6.0	0.0	70.0	58.0
Generator Sets	1	82	100	40	0.40	-6.0	-4.0	88.0	72.0
Welders	3	64	100	40	1.20	-6.0	0.8	70.0	58.8
Tractors/Loaders/Backhoes	1	80	100	40	0.40	-6.0	-4.0	86.0	70.0
							Log Sum		72.7
Paving									
Cement and Mortar Mixers	1	85	100	40	0.40	-6.0	-4.0	91.0	75.0
Pavers	1	85	100	50	0.50	-6.0	-3.0	91.0	76.0
Paving Equipment	1	85	100	20	0.20	-6.0	-7.0	91.0	72.0
Tractors/Loaders/Backhoes	1	80	100	40	0.40	-6.0	-4.0	86.0	70.0
Rollers	1	85	100	20	0.20	-6.0	-7.0	91.0	72.0
							Log Sum		80.1
Architectural Coating									
Air Compressors	1	80	100	40	0.40	-6.0	-4.0	86.0	70.0
							Log Sum		70.0

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018).

(2) Source: https://www.google.com/url?q=http://www.noisetesting.info/blog/warehouse-forklift-workplace-noise-levels/&sa=D&source=hangouts&ust=1545259247311000&usg=AFQjCNHFcKKoEKUjv5VZMOtw_KO977Em1A

APPENDIX C

SoundPLAN Data

Noise emissions of road traffic

Station km	ADT Veh/24	Vehicles type	Vehicle name	Traffic values day Veh/h	evenin Veh/h	night Veh/h	Speed km/h	Control device	Constr Speed km/h	Affect. veh. %	Road surface	Gradier Min / M %
Cannon Road NB			Traffic direction: In entry direction									
0+000	11259	Total	-	677	493	146	-	none	-	-	Average (of DGAC and PCC)	0.0
		Automobiles	-	660	490	122	64					
		Medium trucks	-	9	2	12	64					
		Heavy trucks	-	9	2	12	64					
		Buses	-	-	-	-	-					
		Motorcycles	-	-	-	-	-					
		Auxiliary vehicle	-	-	-	-	-					
0+427	-							-	-	-	-	-
Cannon Road SB			Traffic direction: In entry direction									
0+000	11259	Total	-	677	493	146	-	none	-	-	Average (of DGAC and PCC)	0.0
		Automobiles	-	660	490	122	64					
		Medium trucks	-	9	2	12	64					
		Heavy trucks	-	9	2	12	64					
		Buses	-	-	-	-	-					
		Motorcycles	-	-	-	-	-					
		Auxiliary vehicle	-	-	-	-	-					
0+407	-							-	-	-	-	-

Receiver list

No.	Receiver name	Building side	Floor	Limit Lden dB(A)	Level w/o NP Lden dB(A)	Level w NP Lden dB(A)	Difference Lden dB	Conflict Lden dB
1	2	South east	GF	-	59.3	0.0	-59.3	-
2		South east	GF	-	64.7	0.0	-64.7	-
3	3	South east	GF	-	60.5	0.0	-60.5	-
4	4	East	GF	-	50.2	0.0	-50.2	-
5	5	North	GF	-	29.1	0.0	-29.1	-
6	6	West	GF	-	32.2	0.0	-32.2	-
7	7	South west	GF	-	33.1	0.0	-33.1	-
8	8	South east	GF	-	56.1	0.0	-56.1	-
9	9	-	GF	-	53.3	0.0	-53.3	-

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP Lden dB(A)	Level w NP Lden dB(A)
2 GF		59.3	0.0
Cannon Road NB	-	55.7	-
Cannon Road SB	-	56.9	-
2 GF		64.7	0.0
Cannon Road NB	-	60.3	-
Cannon Road SB	-	62.8	-
3 GF		60.5	0.0
Cannon Road NB	-	56.8	-
Cannon Road SB	-	58.0	-
4 GF		50.2	0.0
Cannon Road NB	-	46.8	-
Cannon Road SB	-	47.6	-
5 GF		29.1	0.0
Cannon Road NB	-	22.0	-
Cannon Road SB	-	28.1	-
6 GF		32.2	0.0
Cannon Road NB	-	28.0	-
Cannon Road SB	-	30.2	-
7 GF		33.1	0.0
Cannon Road NB	-	30.2	-
Cannon Road SB	-	29.9	-
8 GF		56.1	0.0
Cannon Road NB	-	52.6	-
Cannon Road SB	-	53.5	-
9 GF		53.3	0.0
Cannon Road NB	-	49.7	-
Cannon Road SB	-	50.9	-

APPENDIX D

Groundborne Vibration Worksheets

GROUNDBORNE VIBRATION ANALYSIS			
Project:	Ocean Hills	Date:	4/28/19
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Project Site		
Address:	Closest Structure to Site		
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	30.00	Distance from Equipment to Receiver (ft)	
n =	1.10	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.172	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	Ocean Hills		Date: 4/28/19
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Project Site		
Address:	Closest Structure to Site		
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment = Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	30.00	Distance from Equipment to Receiver (ft)	
n =	1.10	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.073	IN/SEC	OUTPUT IN BLUE

APPENDIX E

Offsite Project Generated Vehicle Noise Worksheets

FHWA Traffic Noise Prediction Model FHWA-RD-77-108

Existing Traffic Noise

Project: **Ocean Hills Senior Living**
Road: **Cannon Road**
Segment: **North and South of Project Site**

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	4583.00
										SPEED	45.00
										DISTANCE	50.00
INPUT PARAMETERS											
Vehicles per hour	276.97	3.67	3.67	205.64	0.61	0.61	51.01	5.09	5.09	% A	96
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	% HT	2
ADJUSTMENTS											
Flow	17.59	-1.20	-1.20	16.29	-8.98	-8.98	10.24	0.23	0.23		
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	67.24
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	**63.14**
LEQ	61.86	51.36	55.88	60.57	43.58	48.09	54.51	52.78	57.30	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	63.14		EVENING LEQ	60.89		NIGHT LEQ	60.04		Use hour?	no
										GRADE dB	0.00

FHWA Traffic Noise Prediction Model FHWA-RD-77-108

Existing Plus Project Traffic Noise

Project: **Ocean Hills Senior Living**
Road: **Cannon Road**
Segment: **North and South of Project Site**

		DAYTIME			EVENING			NIGHTTIME		ADT	5310.00
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	SPEED	45.00
										DISTANCE	50.00
INPUT PARAMETERS											
Vehicles per hour	320.91	4.25	4.25	238.26	0.71	0.71	59.10	5.90	5.90	% A	96.00
Speed in MPH	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2.00
NOISE CALCULATIONS											
Reference levels	69.34	77.62	82.14	69.34	77.62	82.14	69.34	77.62	82.14	% HT	2.00
ADJUSTMENTS											
Flow	18.23	-0.56	-0.56	16.93	-8.34	-8.34	10.88	0.87	0.87		
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	67.88
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	**63.78**
LEQ	62.50	52.00	56.52	61.21	44.21	48.73	55.15	53.42	57.94	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	63.78		EVENING LEQ	61.53		NIGHT LEQ	60.68		Use hour?	no
										GRADE dB	0.00

FHWA Traffic Noise Prediction Model FHWA-RD-77-108

Existing Traffic Noise

Project: **Ocean Hills Senior Living**
Road: **Mystra Way**
Segment: **West of Project Site**

	DAYTIME AUTOS	DAYTIME M.TRUCKS	DAYTIME H.TRUCKS	EVENING AUTOS	EVENING M.TRUCKS	EVENING H.TRUCKS	NIGHTTIME AUTOS	NIGHTTIME M.TRUCKS	NIGHTTIME H.TRUCKS		
										ADT	1762.00
										SPEED	30.00
										DISTANCE	50.00
INPUT PARAMETERS											
Vehicles per hour	106.49	1.41	1.41	79.06	0.23	0.23	19.61	1.96	1.96	% A	96
Speed in MPH	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2
NOISE CALCULATIONS											
Reference levels	62.51	73.11	78.76	62.51	73.11	78.76	62.51	73.11	78.76	% HT	2
ADJUSTMENTS											
Flow	15.20	-3.59	-3.59	13.90	-11.37	-11.37	7.85	-2.16	-2.16		
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	60.11
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	**54.97**
LEQ	52.64	44.46	50.10	51.34	36.68	42.32	45.29	45.88	51.53	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	54.97		EVENING LEQ	51.99		NIGHT LEQ	53.32		Use hour?	no
										GRADE dB	0.00

FHWA Traffic Noise Prediction Model FHWA-RD-77-108

Existing Plus Project Traffic Noise

Project: **Ocean Hills Senior Living**
Road: **Mystra Way**
Segment: **West of Project Site**

	DAYTIME			EVENING			NIGHTTIME				
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS	ADT	2073.00
										SPEED	30.00
										DISTANCE	50.00
INPUT PARAMETERS											
Vehicles per hour	125.28	1.66	1.66	93.01	0.28	0.28	23.07	2.30	2.30	% A	96.00
Speed in MPH	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00		
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00		
Right angle	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	% MT	2.00
NOISE CALCULATIONS											
Reference levels	62.51	73.11	78.76	62.51	73.11	78.76	62.51	73.11	78.76	% HT	2.00
ADJUSTMENTS											
Flow	15.90	-2.88	-2.88	14.61	-10.66	-10.66	8.55	-1.45	-1.45		
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	LEFT	-90.00
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	RIGHT	90.00
Barrier	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Grade	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CNEL	60.81
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00	DAY LEQ	**55.67**
LEQ	53.34	45.16	50.81	52.05	37.38	43.03	46.00	46.59	52.24	Day hour	89.00
										Absorbtive?	no
	DAY LEQ	55.67		EVENING LEQ	52.69		NIGHT LEQ	54.03		Use hour?	no
										GRADE dB	0.00

APPENDIX G

Traffic Study

OCEAN HILLS SENIOR LIVING PHASE 2 FACILITY
FOCUSED TRAFFIC IMPACT STUDY
OCEANSIDE, CA

NOVEMBER 2, 2018

(JOB NUMBER 18443)

RICK

RICK ENGINEERING COMPANY

RICK
ENGINEERING COMPANY

rickengineering.com

Ocean Hills Senior Living Phase 2 Facility

Focused Traffic Impact Study

November 2, 2018

Prepared for:

Protea Senior Living Oceanside, LLC
18 Ventana Ridge Drive
Aliso Viejo, CA 92656

Prepared by:

RICK ENGINEERING COMPANY
Traffic Division

Job Number 18443

EXECUTIVE SUMMARY

Ocean Hills Senior Living Phase 2 Facility – Oceanside Focused Traffic Impact Study

November 2, 2018

INTRODUCTION

The following study has been prepared to determine any transportation impacts within the study area transportation network due to the proposed development of the Ocean Hills Senior Living Phase 2 Facility. The Phase 2 project will consist of a three-story, 100,177 square-foot senior living facility that will be built on the northerly half of the 6.46-acre development site. The project site is located at the northeast corner of Cannon Road and Mystra Way in the City of Oceanside.

PROJECT DESCRIPTION

The Ocean Hills Senior Living Phase 1 Facility is currently under construction and will provide 114 residential units with a total of 123 beds. The Phase 1 facility will primarily consist of assisted living and memory care. A total of 50 parking spaces will be provided for the Phase 1 facility.

The proposed Ocean Hills Senior Living Phase 2 Facility project will provide 101 additional residential units with 118 additional beds. The Phase 2 facility will primarily consist of independent senior residential units. The combined Phase 1 and Phase 2 facilities will provide a total of 215 residential units with a total of 241 beds. A total of 153 parking spaces will be provided for the combined Phase 1 and Phase 2 facilities.

PROJECT TRAFFIC VOLUMES

PROJECT TRIP GENERATION

The proposed project weekday trip generation is based on the rate for a Convalescent/Nursing Home use in *SANDAG's Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region (April 2002)* publication. The project's Sunday trip generation is based on the rate for a Continuing Care Retirement Community use in the ITE *Trip Generation* publication (10th Edition, 2017).

Based on the SANDAG weekday trip rates, the Phase 1 project is estimated to generate a total of 369 weekday trips, including 26 AM peak hour trips and 26 PM peak hour trips. The Phase 2 project is estimated to generate 354 weekday trips, including 25 AM peak hour trips and 25 PM peak hour trips. The combined Phase 1 and Phase 2 projects (project buildout) are estimated to generate 723 weekday trips, including 51 AM peak hour trips and 51 PM peak hour trips.

Based on the ITE Sunday trip rates, the Phase 1 project is estimated to generate a total of 228 Sunday trips, including 25 trips during the Sunday peak hour. The Phase 2 project is estimated to generate 202 Sunday trips, including 22 trips during the Sunday peak hour. The combined Phase 1 and Phase 2 projects (project buildout) are estimated to generate 430 Sunday trips, including 47 trips during the Sunday peak hour.

TRAFFIC ANALYSIS

The following intersections and roadways were assessed as part of this analysis:

Intersections

- Cannon Road & Mystra Way
- Cannon Road & Driveway 1
- Cannon Road & Driveway 2
- Mystra Way & Driveway 3

Roadway Segments

- Mystra Way, north of Cannon Road
- Cannon Road, from Mystra Way to Wisteria Drive

The project area intersections and roadways were analyzed for the following analysis scenarios:

- Existing Conditions: This scenario reflects the conditions on the ground today with traffic volume data obtained in October 2018.
- Existing Plus Phase 1 Project Conditions: This scenario reflects existing conditions with the addition of traffic from the Phase 1 project (currently under construction).
- Existing Plus Project Buildout Conditions: This scenario reflects existing conditions with the addition of traffic from both the Phase 1 and Phase 2 projects.

Due to the project site being in close proximity to New Venture Christian Fellowship Church, Sunday traffic conditions were evaluated in addition to the typical weekday conditions.

The results of the level of service (LOS) analysis revealed that the study intersections and roadway segments will operate at an acceptable LOS B or better through Existing Plus Project Buildout conditions (Phases 1 and 2). Therefore, no significant impacts were identified and no mitigation measures are required.

The results of the queuing analysis that was conducted at the Cannon Road/Mystra Way intersection showed that the weekday and Sunday peak hour 95th percentile queue lengths are not forecast to exceed the available storage lane capacities under either Existing or Existing Plus Project Buildout conditions.

SITE ACCESS, CIRCULATION AND PARKING

The project will take access from two driveways on Cannon Road and one driveway on Mystra Way for both phases of development. The two driveways on Cannon Road will be restricted to right-in/right-out access, and full access will be provided for the proposed driveway on Mystra Way. The easterly driveway on Cannon Road and Mystra Way will provide access to both the Phase 1 and Phase 2 sites, while the westerly driveway on Cannon Road will provide access to parking near the main entrance of the Phase 1 building.

The Phase 1 project is required to provide a minimum of 41 parking spaces, and the combined Phase 1 and 2 projects (Project Buildout) is required to provide a minimum of 81 parking spaces. A total of 50 parking spaces will be provided for the Phase 1 project, and a total of 153 spaces will be provided for the project at buildout (combined Phases 1 and 2). Therefore, the proposed number of parking spaces provided will exceed the City's minimum parking requirements for the project.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1 INTRODUCTION

The following study has been prepared to determine any transportation impacts within the study area transportation network due to the proposed development of the Ocean Hills Senior Living Phase 2 Facility. The project will consist of a three-story, 100,177 square-foot senior living facility that will be built on the northerly half of the 6.46-acre development site. The project site is located at the northeast corner of Cannon Road and Mystra Way in the City of Oceanside. **Exhibit 1-1** shows the project vicinity map.

1.1 Project Description

The Ocean Hills Senior Living Phase 1 Facility is currently under construction and will provide 114 residential units with a total of 123 beds. The Phase 1 facility will primarily consist of assisted living and memory care. A total of 50 parking spaces will be provided for the Phase 1 facility.

The proposed Ocean Hills Senior Living Phase 2 Facility project will provide 101 additional residential units with 118 additional beds. The Phase 2 facility will primarily consist of independent senior residential units. The combined Phase 1 and Phase 2 facilities will provide a total of 215 residential units with a total of 241 beds. A total of 153 parking spaces will be provided for the combined Phase 1 and Phase 2 facilities. **Exhibit 1-2** shows the proposed project site plan.

1.2 Study Area

The project study area is based on the City's *Traffic Impact Study Detailed Guidelines* contained in the Circulation Element and was coordinated with City staff. The primary basis of this report is to determine if there are any traffic operation issues with the addition of the project to the following local intersections and roadways:

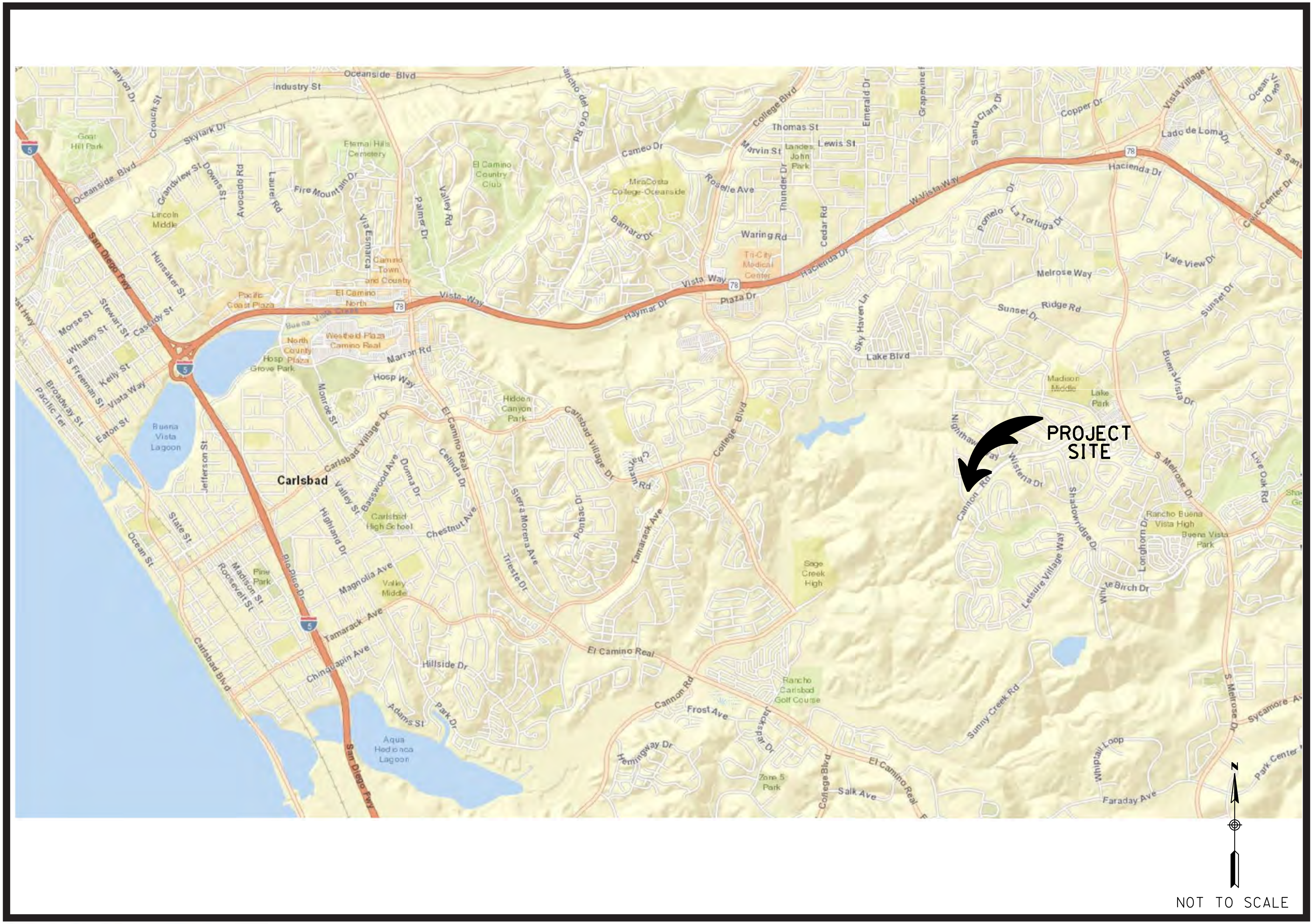
Intersections

- Cannon Road & Mystra Way
- Cannon Road & Driveway 1
- Cannon Road & Driveway 2
- Mystra Way & Driveway 3

Roadway Segments

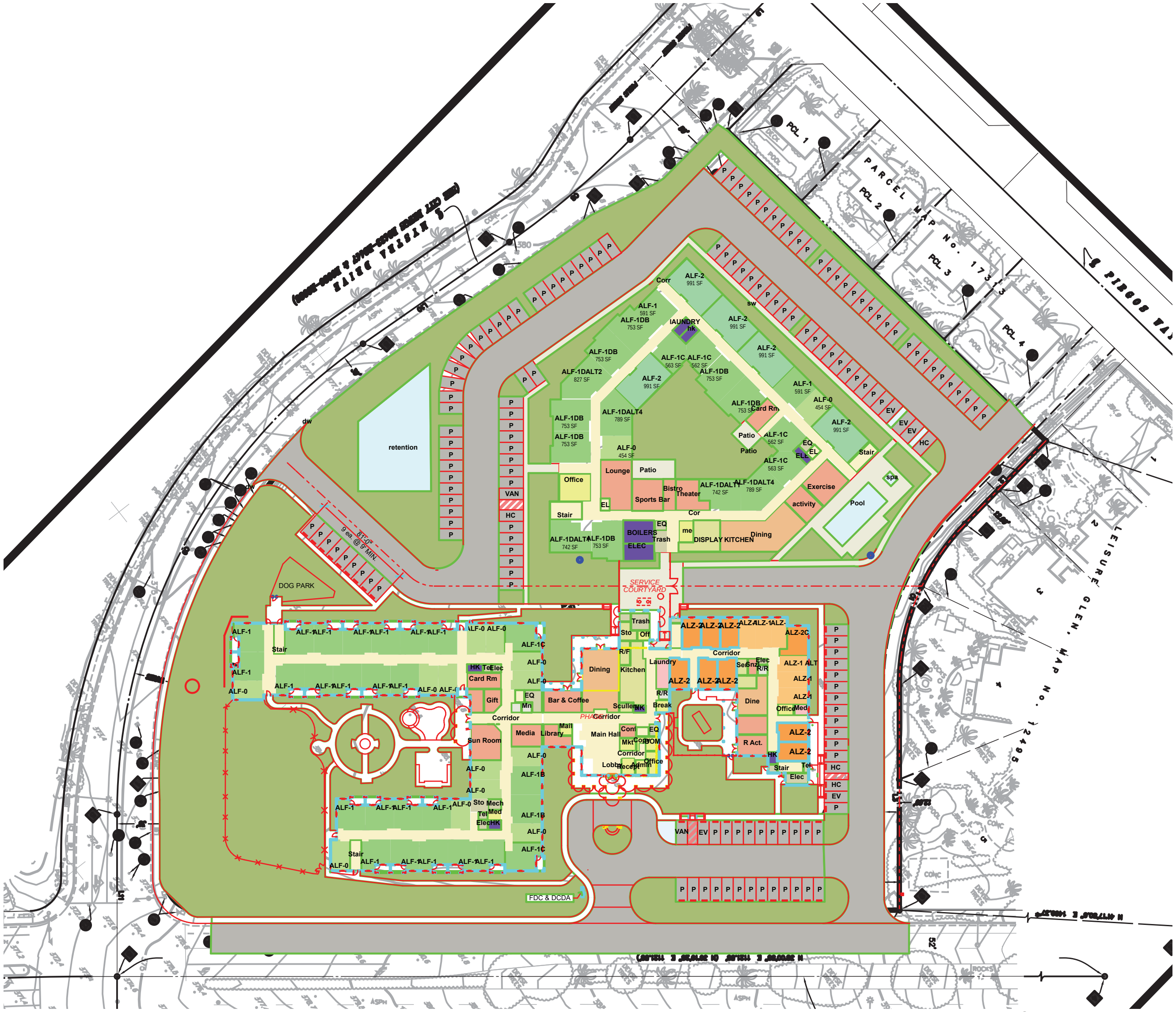
- Mystra Way, north of Cannon Road
- Cannon Road, from Mystra Way to Wisteria Drive

Figure 1-3 illustrates the location of the project and the project study area.



RICK ENGINEERING COMPANY

Figure 1-1
Regional Project Location



01 SIte Plan
SCALE: 1" = 40'

UNIT MIX

Unit Name	Unit Type	Beds	Qty	Area (S...	Total (SF)
Phase 1					
ALF-0	ASSISTED LIVING - STUDIO	1	39	364	14,196
ALF-0B	ASSISTED LIVING - STUDIO	1	1	424	424
ALF-0C	ASSISTED LIVING - STUDIO	1	1	447	447
ALF-1	ASSISTED LIVING - 1 BED	1	46	499	22,954
ALF-1B	ASSISTED LIVING - 1 BED	1	8	554	4,440
ALF-1C	ASSISTED LIVING - 1 BED	1	4	608	2,432
ALZ-1	ALZHEIMER - 1 BED	1	5	305	1,525
ALZ-1 ALT	ALZHEIMER - 1 BED	1	1	300	300
ALZ-2	ALZHEIMER - 2 BED	2	8	366	2,928
ALZ-2C	ALZHEIMER - 2 BED	2	1	445	445
		123	**114**		**50,091 sq ft**
Phase 2					
ALF-0	ASSISTED LIVING - STUDIO	1	10	454	4,540
ALF-1	ASSISTED LIVING - 1 BED	1	6	591	3,546
ALF-1b	ASSISTED LIVING - 1 BED	1	4	562	2,248
ALF-1C	ASSISTED LIVING - 1 BED	1	8	562	4,496
ALF-1C	ASSISTED LIVING - 1 BED	1	8	563	4,504
ALF-1DALT1	ASSISTED LIVING - 1 BED	1	10	742	7,420
ALF-1DALT2	ASSISTED LIVING - 1 BED	1	5	827	4,135
ALF-1DALT4	ASSISTED LIVING - 1 BED	1	6	789	4,734
ALF-1DB	ASSISTED LIVING - 1 BED	1	27	753	20,331
ALF-2	ASSISTED LIVING - 2 BED	2	17	991	16,847
		118	**101**		**72,801 sq ft**
		241	**215**		**122,892 sq ft**

Gross Area Calcs

	Area (SF)
First Floor	33,113
Phase I - 2nd Floor	37,935
Phase I - First Floor	44,096
Phase II - First Floor	33,113
Phase II - Third Floor	33,532
Phase II Second Floor	33,532
	215,321 sq ft

Parking Count

	Qty
EV	5
HC	4
P	142
VAN	2
	153

IPA IRWIN PARTNERS ARCHITECTS
245 Fischer Avenue, Suite B-2 Costa Mesa CA 92626
(714) 557 2448 www.ipaoc.com
ARCHITECTURE PLANNING CONSULTING

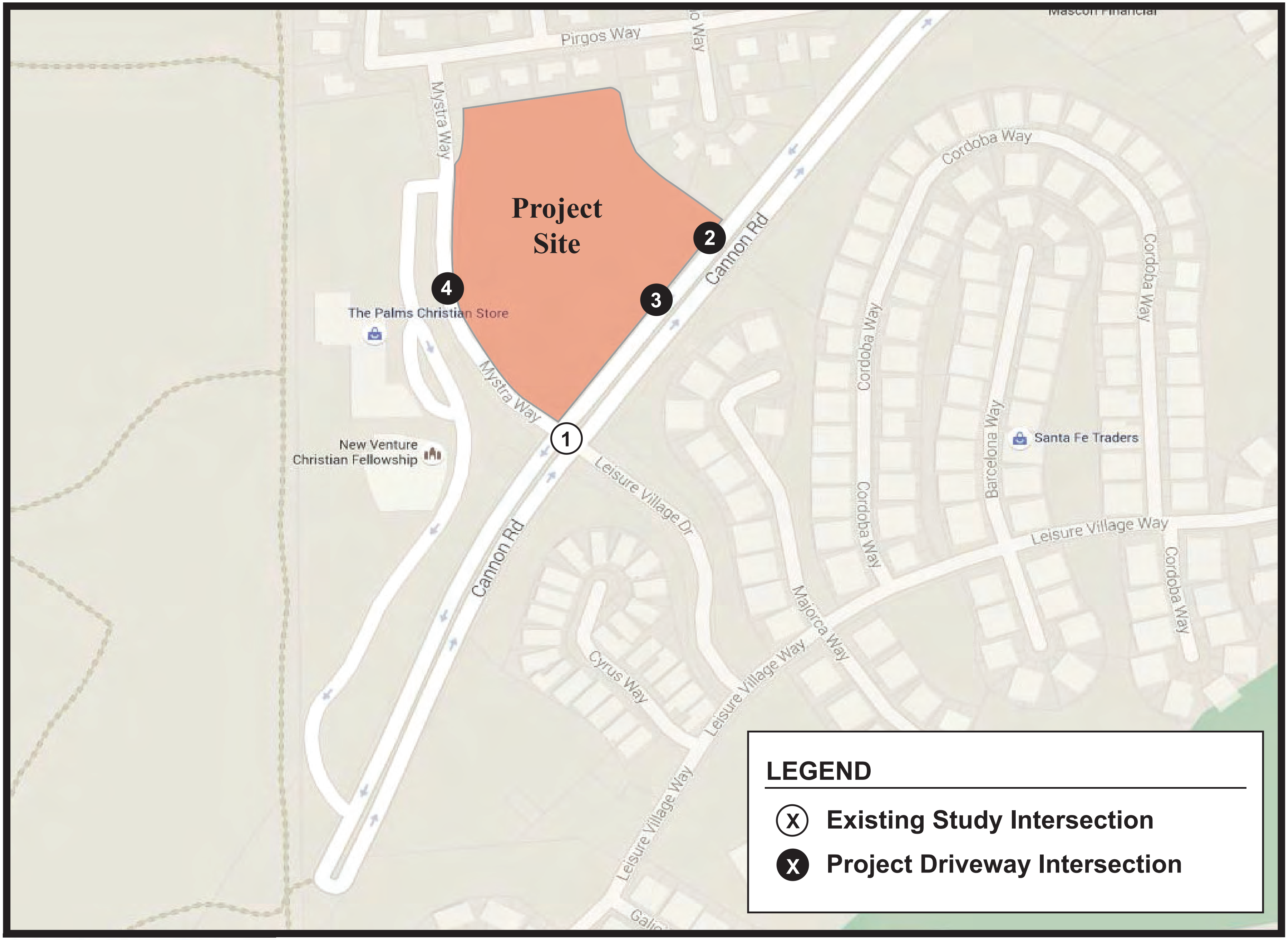
Oceanside Senior Living
Protea Senior Living Oceanside, LLC
Cannon Rd & Mystra Way
Oceanside, CA 92056

Applicant:
Protea Senior Living Oceanside, LLC
18 Ventana Ridge Dr.
Aliso Viejo, CA 92656

Site Plan
A1
PROJECT NO: 16005
PLOT DATE: 7/10/2018
18009 Oceanside II SD.pln

RICK ENGINEERING COMPANY

Figure 1-2
Project Site Plan



RICK ENGINEERING COMPANY

Figure 1-3
Project Study Area

2 ANALYSIS APPROACH AND METHODOLOGY

This section summarizes the analysis approach and methodology used to evaluate the study intersections and roadway segments associated with the proposed project.

2.1 Analysis Timeframes

The following timeframes and scenarios are evaluated in this traffic study:

- Existing Conditions: This scenario reflects the conditions on the ground today with traffic volume data obtained in October 2018.
- Existing Plus Phase 1 Project Conditions: This scenario reflects existing conditions with the addition of traffic from the Phase 1 project (currently under construction).
- Existing Plus Project Buildout Conditions: This scenario reflects existing conditions with the addition of traffic from both the Phase 1 and Phase 2 projects.

Due to the project site being in close proximity to New Venture Christian Fellowship Church, Sunday traffic conditions were evaluated in addition to the typical weekday conditions. Sunday church services are held from 8:30 AM to 10:00 AM and from 10:30 AM to 12:00 PM. It is assumed that the highest church-related traffic would occur between 10:00 AM and 10:30 AM during the transition between the first and second services. Therefore, the Sunday peak hour was assumed to occur between 9:00 AM and 11:00 AM.

2.2 Methodology

2.2.1 Intersection Delay Analysis

Levels of service (LOS) were determined at the study area intersections for the weekday AM and PM peak hours, and Sunday peak hour. The weekday AM intersection analysis evaluates LOS during the hour with the highest vehicular traffic between 7:00 AM and 9:00 AM. The weekday PM intersection analysis evaluates LOS during the hour with the highest vehicular traffic between 4:00 PM and 6:00 PM. The Sunday AM intersection analysis evaluates LOS during the hour with the highest vehicular traffic between 9:00 AM and 11:00 AM.

Signalized and unsignalized intersection operations were analyzed with Synchro 9 software (Trafficware). Synchro 9 uses the methodologies outlined in the *2000 Highway Capacity Manual (HCM)*. The 2000 HCM methodology was used because Synchro will not calculate LOS based on the 2010 HCM for signalized intersections that have a configuration that includes a left-turn lane and a shared left-turn/through lane at an intersection approach. The southbound approach of the Mystra Way/Cannon Road intersection has this configuration.

Signal timing data and parameters such as cycle lengths, splits, clearance intervals, etc. were obtained from the current signal timing sheets provided by the City and calibrated into the Synchro model. Synchro reports delays, which correspond to a particular LOS, to describe the overall operation of an intersection. The criteria for the LOS grade designations are provided in **Table 2-1**. LOS provides a quick overview of how well an intersection is performing. The City of Oceanside considers LOS D or better to be acceptable operations for signalized and unsignalized intersections.

Table 2-1
LOS Criteria for Intersections

LOS	Control Delay (sec/veh) Signalized Intersections (a)	Control Delay (sec/veh) Unsignalized Intersections (b)	Description
A	$\leq$10	$\leq$10	Operations with very low delay and most vehicles do not stop.
B	>10 and $\leq$20	>10 and $\leq$15	Operations with good progression but with some restricted movements.
C	>20 and $\leq$35	>15 and $\leq$25	Operations where a significant number of vehicles are stopping with some backup and light congestion.
D	>35 and $\leq$55	>25 and $\leq$35	Operations where congestion is noticeable, longer delays occur, and many vehicles stop. The proportion of vehicles not stopping declines.
E	>55 and $\leq$80	>35 and $\leq$50	Operations where there is significant delay, extensive queuing, and poor progression.
F	>80	>50	Operations that are unacceptable to most drivers, when the arrival rates exceed the capacity of the intersection.

Source: *2000 and 2010 Highway Capacity Manual (HCM).*

2.2.2 Roadway Segment Capacity Analysis

The basis for analysis of roadway segment performance is provided by LOS standards and thresholds. The LOS analysis considerations include the functional classification of the roadway, maximum capacity, roadway geometrics, and Average Daily Traffic (ADT) volumes. The analysis results provide a quick overview of whether a segment is under, approaching, or over capacity. The City of Oceanside considers LOS D or better to be acceptable for daily roadway segment operations. **Table 2-2** presents the roadway segment capacity and LOS standards utilized by the City of Oceanside.

Table 2-2
LOS Criteria for Roadway Segments

Street Classification	Level of Service				
	A	**B**	**C**	**D**	**E**
Expressway (6-lane)	< 30,000	< 42,000	< 60,000	< 70,000	< 80,000
Expressway (4-lane)	< 25,000	< 35,000	< 50,000	< 55,000	< 60,000
Prime Arterial (6-lane)	< 25,000	< 35,000	< 50,000	< 55,000	< 60,000
Major Arterial (6-lane, divided)	< 20,000	< 28,000	< 40,000	< 45,000	< 50,000
Major Arterial (5-lane, divided)	< 17,500	< 24,500	< 35,000	< 40,000	< 45,000
Major Arterial (4-lane, divided)	< 15,000	< 21,000	< 30,000	< 35,000	< 40,000
Secondary Collector (4-lane w/center lane)	< 10,000	< 14,000	< 20,000	< 25,000	< 30,000
Secondary Collector (4-lane w/o center lane)	< 9,000	< 13,000	< 18,000	< 22,000	< 25,000
Collector (commercial fronting, 2-lanes with 2-way left-turn lane)	< 5,000	< 7,000	< 10,000	< 13,000	< 15,000
Collector (residential streets in Circulation Element or industrial fronting)	< 4,000	< 5,500	< 7,500	< 9,000	< 10,000
Local Street (residential streets NOT in Circulation Element)	-	-	< 2,200	-	-

Notes:
Capacity values and corresponding LOS based on Table 3-3 in the City of Oceanside General Plan Circulation Element.

2.3 Significance Criteria

The City of Oceanside has established LOS D as the standard for acceptable intersection and roadway segment operations. Oceanside refers to the *SANTE/ITE Guidelines for Traffic Impact Studies (TIS) in the San Diego Region* (March 2000) to determine the significance of traffic impacts in regards to requiring mitigation in the study area.

The City of Oceanside considers the following criteria to determine project-related significant traffic impacts:

1. Project-related traffic results in a change in level of service from acceptable (LOS D or better) to deficient (LOS E or F) at a study intersection or on a roadway segment; OR
2. Project-related traffic results in an increase in delay of 2.0 seconds or more at a study intersection operating at a deficient LOS (LOS E or F), or results in an increase in v/c ratio of 0.020 or more on a roadway segment operating at a deficient LOS (LOS E or F).

3 EXISTING CONDITIONS

This section summarizes the existing roadway network, peak-hour and daily traffic volumes, and operations at the study area intersections and roadway segments.

3.1 Roadway Network

Cannon Road is classified as a 4-Lane Major Arterial and is oriented in northeast-southwest direction in the study area. Two lanes of travel are provided in each direction, and on-street parking is not allowed. The posted speed limit is 45 mph.

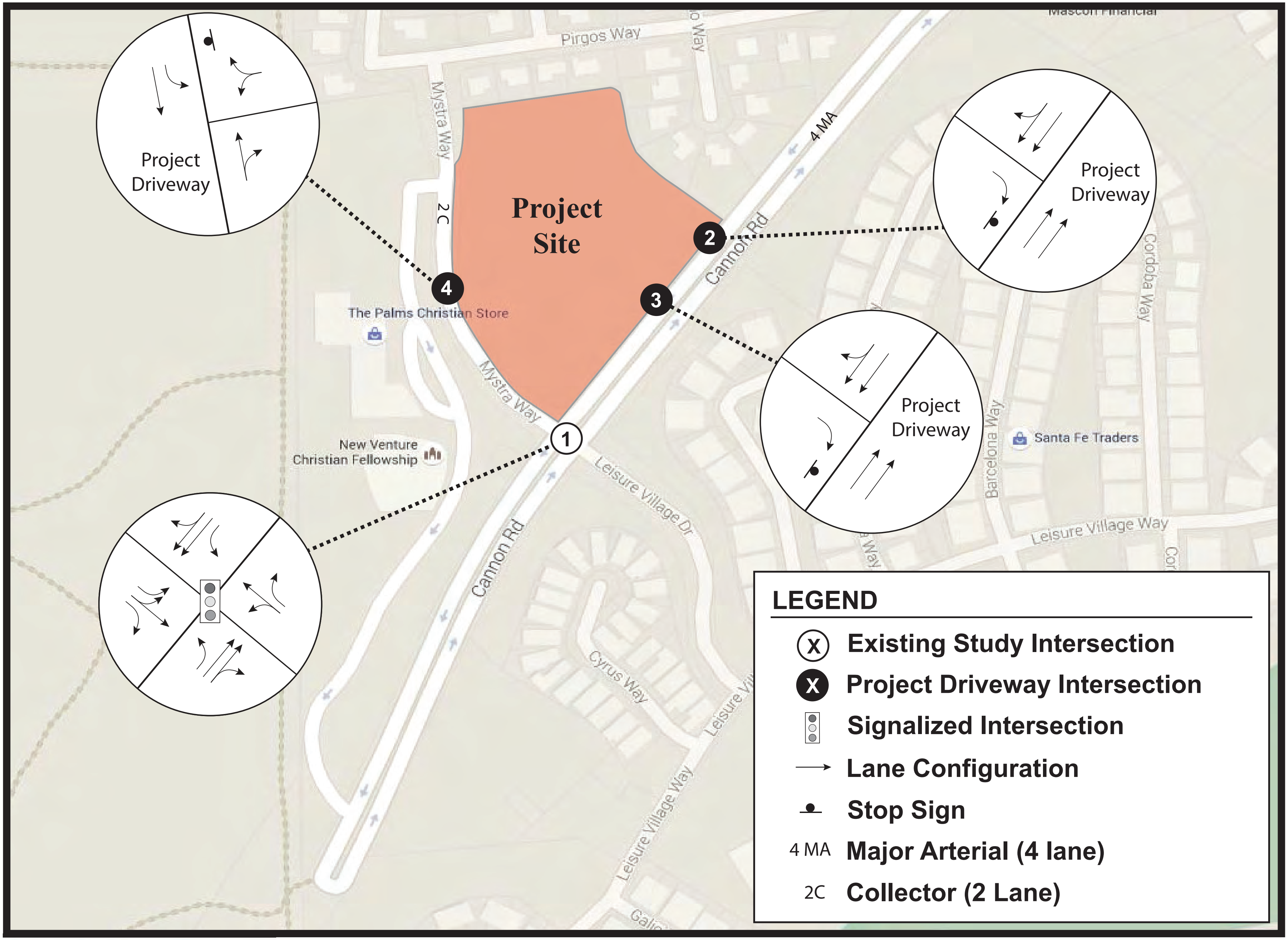
Mystra Way is classified as a 2-Lane Collector and is oriented in a north-south direction in the study area. One lane of travel is provided in each direction, and on-street parking is not allowed. The posted speed limit is 25 mph.

Figure 3-1 illustrates the existing lane geometrics at the study intersections and classifications of the roadway segments within the study area.

3.2 Traffic Volumes

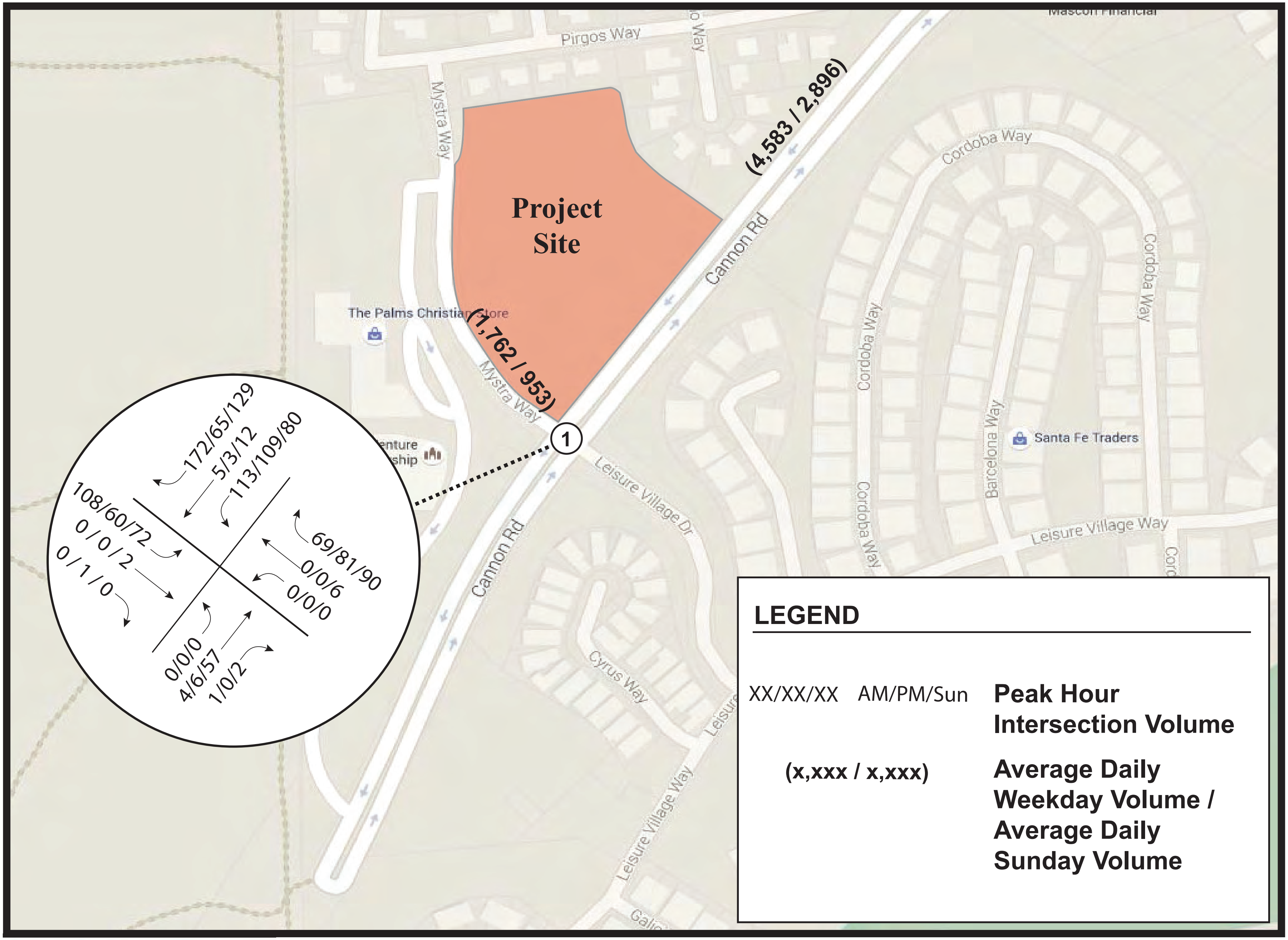
Traffic volumes at the study intersection of Cannon Road & Mystra Way were collected on Tuesday, October 2, 2018 for the weekday AM peak period (7:00 AM to 9:00 AM) and PM peak period (4:00 PM to 6:00 PM), and on Sunday, October 7, 2018 during the Sunday AM peak period (9:00 AM to 11:00 AM) that includes the transition between the first and second services at the adjacent New Venture Christian Fellowship church. Daily volumes on the study area roadway segments were also collected on Tuesday, October 2, 2018 and on Sunday, October 7, 2018 over a 24-hour period in both directions of travel.

Figure 3-2 illustrates the existing study area peak hour and daily traffic volumes. **Appendix A** contains the count data sheets.



RICK ENGINEERING COMPANY

Figure 3-1
Existing and Future Intersection and Roadway Segment Geometrics



RICK ENGINEERING COMPANY

Figure 3-2
Existing Traffic Volumes

3.3 Intersection Analysis

Table 3-1 displays the LOS analysis results for the study intersections under Existing Conditions. As shown in the table, the existing study intersection of Cannon Road / Mystra Way operates at an acceptable LOS B during both the weekday and Sunday peak hours. **Appendix B** contains the intersection LOS worksheets.

Table 3-1
Existing Peak-Hour Intersection LOS Summary

#	Intersection	Traffic Control	Peak Hour	Delay [a]	LOS [b]
1	Cannon Road & Mystra Way	Signal	AM	13.9	B
			PM	13.0	B
			Sunday	14.3	B

Notes:
[a] Delays are reported as the average control delay for the entire intersection at signalized intersections and the worst movement at unsignalized intersections.
[b] LOS calculations are based on the methodology outlined in the *2000 Highway Capacity Manual* and performed using Synchro 9.

3.4 Roadway Segment Analysis

Table 3-2 summarizes the daily operations of the study area roadway segments under Existing Conditions. As shown in the table, the two study roadway segments are currently operating at an acceptable LOS A based on existing average daily traffic (ADT) volumes during both weekday and Sunday conditions.

Table 3-2
Existing Roadway Segment LOS Summary

Roadway Segment	Classification [a]	LOS E Capacity	ADT	v/c Ratio	LOS
Weekday Daily Operations					
Mystra Way, North of Cannon Road	2 Lane Collector	10,000	1,762	0.117	A
Cannon Road, Mystra Way to Wisteria Drive	4 Lane Major	40,000	4,583	0.115	A
Sunday Daily Operations					
Mystra Way, North of Cannon Road	2 Lane Collector	10,000	953	0.064	A
Cannon Road, Mystra Way to Wisteria Drive	4 Lane Major	40,000	2,896	0.072	A

Notes:
[a] The roadway classifications were obtained from the City of Oceanside General Plan Circulation Element (Figure 3.1 Existing Roadway Classifications).

4 PROJECT TRAFFIC

This section describes the forecast trip generation, trip distribution, and assignment of trips on the adjacent roadway network.

4.1 Project Trip Generation

Trip generation rates published by the SANDAG *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*, April 2002 were applied to the proposed project to determine the traffic generation characteristics of the site.

Table 4-1 summarizes the weekday trip generation for the project site. As shown in Table 4-1, the Phase 1 project would generate approximately 369 weekday trips, including 26 AM peak hour trips and 26 PM peak hour trips. The Phase 2 project would generate approximately 354 weekday trips, including 25 AM peak hour trips and 25 PM peak hour trips. The combined Phase 1 and Phase 2 projects (project buildout) would generate approximately 723 weekday trips, including 51 AM peak hour trips and 51 PM peak hour trips.

Table 4-1
Weekday Trip Generation Summary

WEEKDAY TRIP GENERATION RATES (SANDAG)											
					AM PEAK HOUR				PM PEAK HOUR			
Land Use	**Rate**				**% of ADT**	**In:Out Ratio**			**% of ADT**	**In:Out Ratio**		
Convalescent/ Nursing	3	trips	/	bed	7%	0.60	:	0.40	7%	0.40	:	0.60

TRIP GENERATION CALCULATIONS									
				AM PEAK HOUR			**PM PEAK HOUR**		
Land Use	**Amount**		**ADT**	**Total**	**In**	**Out**	**Total**	**In**	**Out**
Phase 1 Development (Under Construction)									
Senior Living	123	beds	369	26	16	10	26	10	16
Phase 2 Development (Proposed)									
Senior Living	118	beds	354	25	15	10	25	10	15
Project Buildout (Phases 1 & 2 Combined)									
Senior Living	241	beds	**723**	**51**	**31**	**20**	**51**	**20**	**31**

Notes:
The trip rates for the proposed uses are based on *SANDAG's Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region, April 2002*.

Table 4-2 summarizes the Sunday trip generation for the project site. SANDAG does not include Sunday trip generation rates for senior living use; therefore, the Institute of Transportation Engineers (ITE) Sunday trip generation rate for a Continuing Care Retirement Community (ITE Code 255) was used to calculate the Sunday trips.

As shown in Table 4-2, the Phase 1 project would generate approximately 228 Sunday trips, including 25 trips during the Sunday peak hour. The Phase 2 project would generate approximately 202 Sunday trips, including 22 trips during the Sunday peak hour. The combined Phase 1 and Phase 2 projects (project buildout) would generate approximately 430 Sunday trips, including 47 trips during the Sunday peak hour.

Table 4-2
Sunday Trip Generation Summary

SUNDAY TRIP GENERATION RATES (ITE)								
					SUNDAY AM PEAK HOUR			
Land Use	**Daily Rate**				**Rate**	**In:Out Ratio**		
Continuing Care Retirement Community (ITE Code 255)	2	trips	/	DU	0.22	0.52	:	0.48

TRIP GENERATION CALCULATIONS						
				AM PEAK HOUR		
Land Use	**Amount**		**ADT**	**Total**	**In**	**Out**
Phase 1 Development (Under Construction)						
Senior Living	114	DU	228	25	13	12
Phase 2 Development (Proposed)						
Senior Living	101	DU	202	22	11	11
Project Buildout (Phases 1 & 2 Combined)						
Senior Living	215	DU	**430**	**47**	**24**	**23**

Notes:
The Sunday trip rates for the proposed use are based on the ITE *Trip Generation* publication (10^{th} Edition, 2017).

4.2 Project Trip Distribution

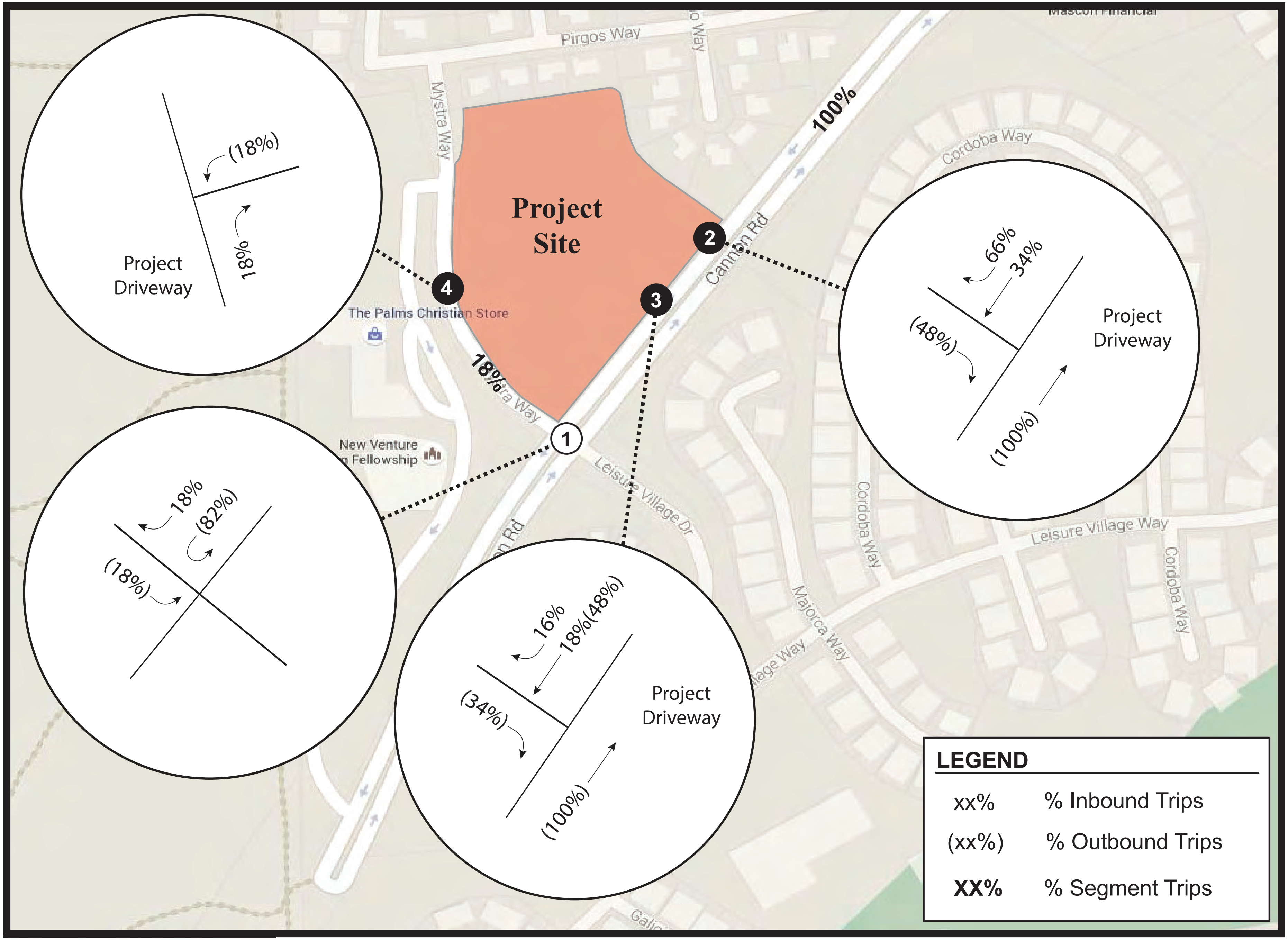
The project trip distribution was developed based on access to major road networks beyond the focused study area. The location of the project site is unique in that it is near the terminus of a major roadway (Cannon Road) in which all traffic volumes originate and end in the surrounding Ocean Hills community. It is assumed that all project trips would distribute from the project site to Cannon Road toward Melrose Drive.

The distribution of turning movement trips at the project driveways is based on proximity between the roadways and the parking spaces on-site.

Figure 4-1 displays the trip distribution patterns for the Phase 1 project, and **Figure 4-2** shows the trip distribution patterns for Project Buildout (Phases One & Two).

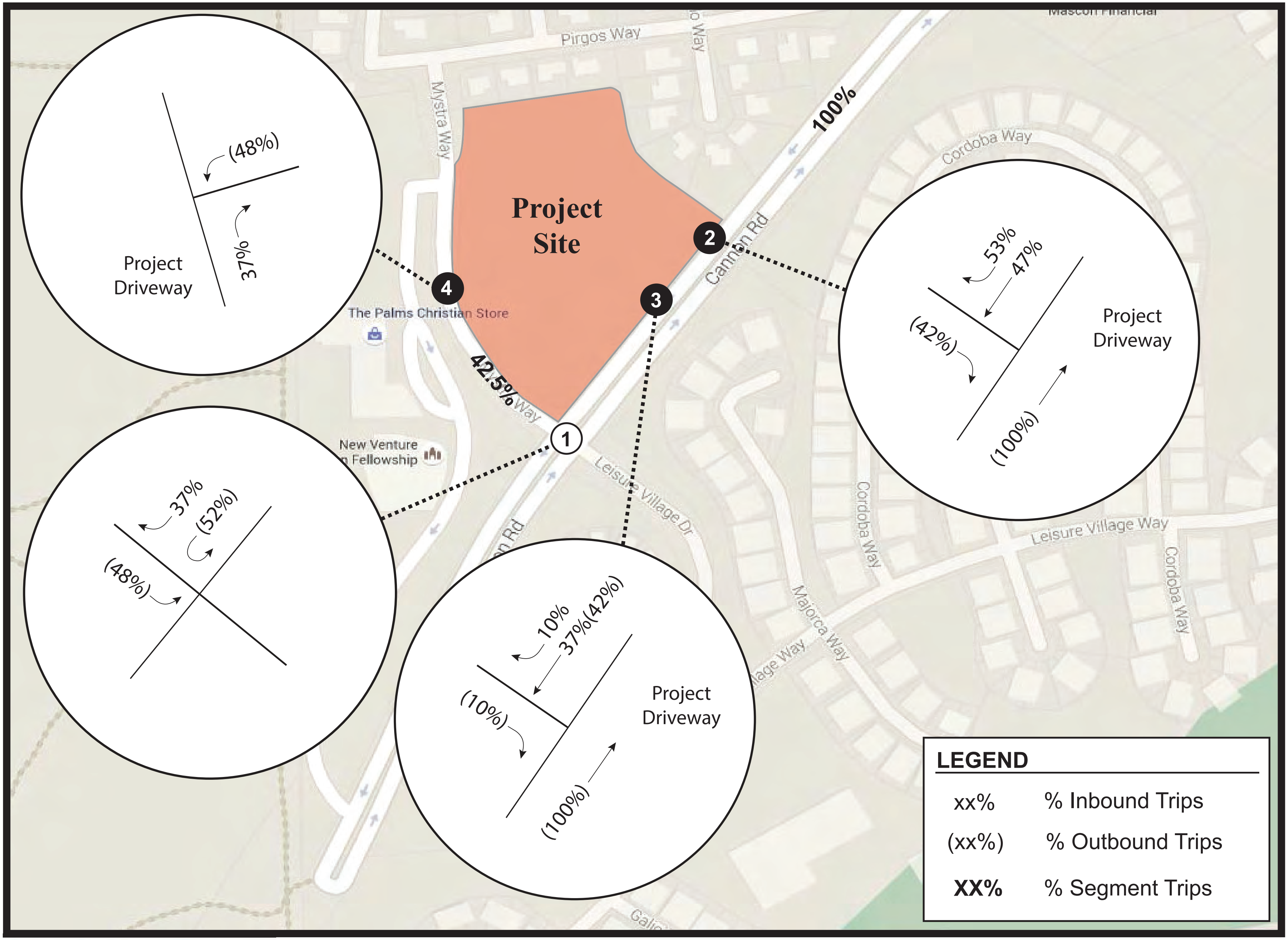
4.3 Project Trip Assignment

Based on the project trip distribution and trip generation, daily, weekday AM/PM and Sunday AM peak hour project trips were assigned to the study area intersections and roadway segments. **Figure 4-3** displays the weekday and Sunday trip assignment for the Phase 1 project. The Project Buildout (Phases One and Two combined) weekday and Sunday trip assignment is shown in **Figure 4-4**.



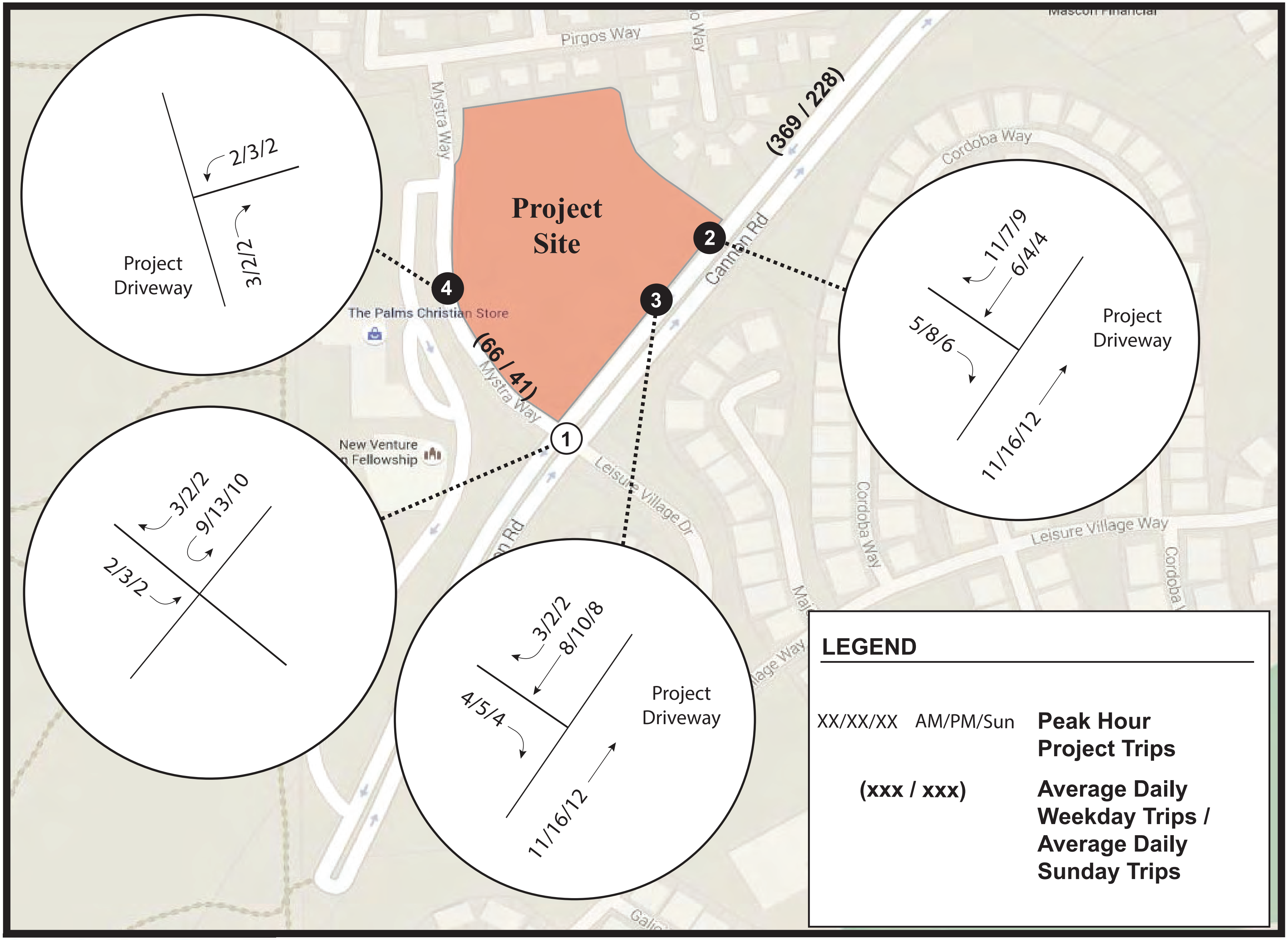
RICK ENGINEERING COMPANY

Figure 4-1
Phase 1 Project Trip Distribution



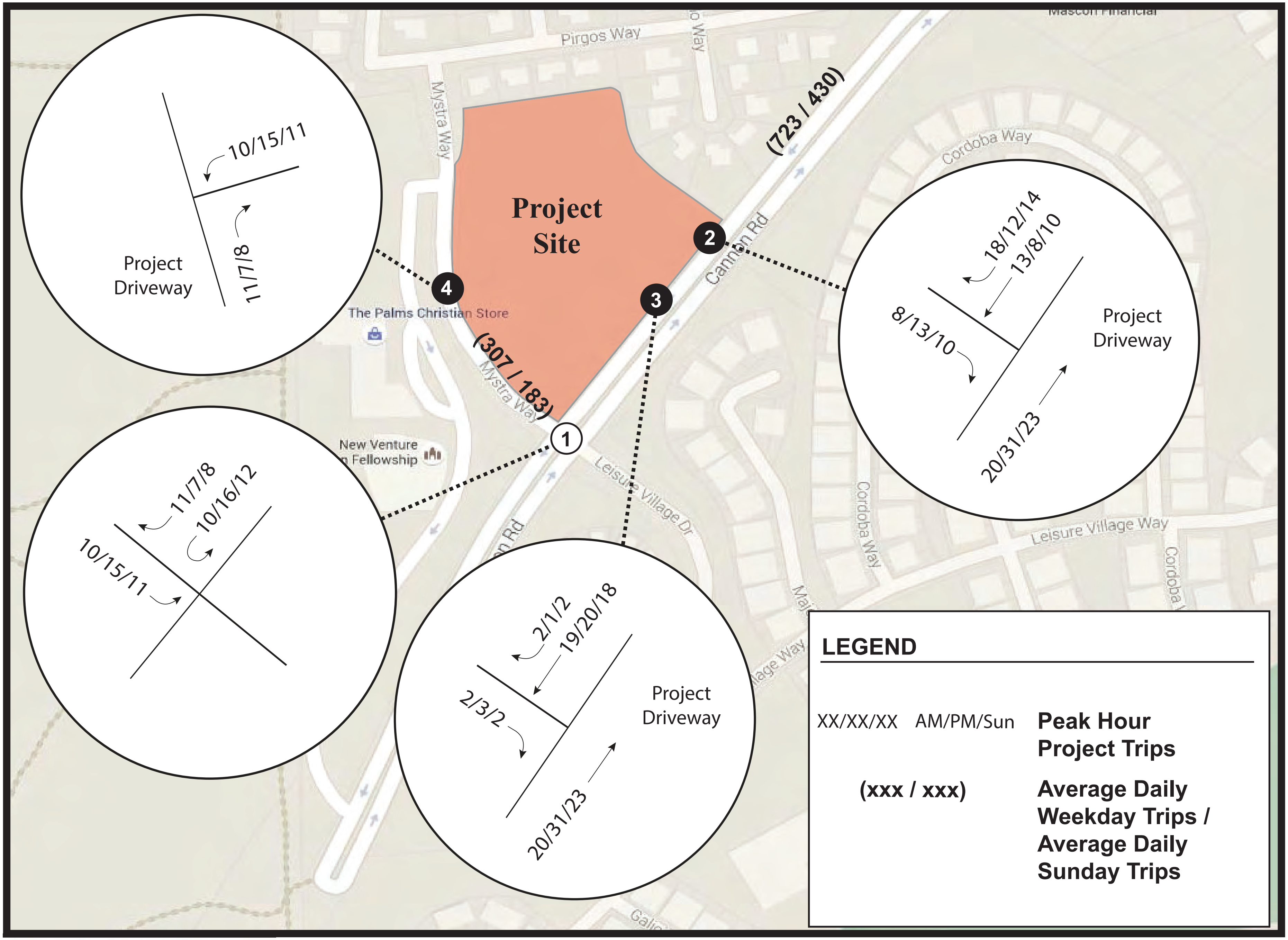
RICK ENGINEERING COMPANY

Figure 4-2
Project Buildout Project Trip Distribution



RICK ENGINEERING COMPANY

Figure 4-3
Phase 1 Project Trip Assignment



RICK ENGINEERING COMPANY

Figure 4-4
Project Buildout Trip Assignment

5 EXISTING PLUS PHASE 1 PROJECT CONDITIONS

This section provides a summary of operations at the study area intersections and roadway segments with the addition of Phase 1 project traffic to existing traffic volumes.

5.1 Traffic Volumes

Figure 5-1 illustrates the Existing Plus Phase 1 Project peak hour and daily traffic volumes at the study area intersections and roadway segments.

5.2 Intersection Analysis

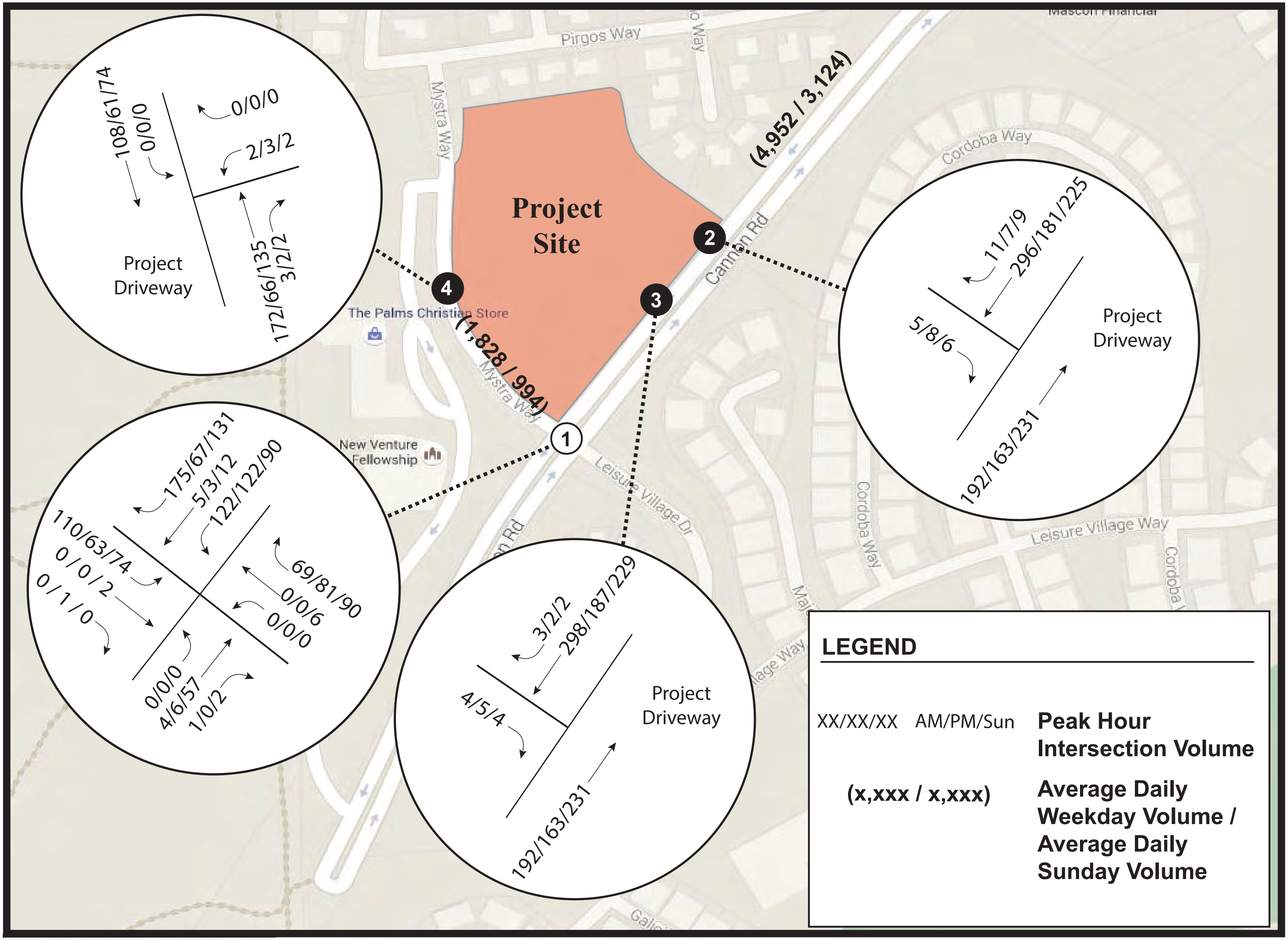
Table 5-1 displays the LOS analysis results for the study intersections under the Existing Plus Phase 1 Project scenario. As shown in the table, the study intersections are expected to operate at an acceptable LOS B or better with the addition of Phase 1 project traffic to existing traffic volumes during the weekday AM and PM peak hours and the Sunday peak hour.

Appendix B contains the intersection LOS worksheets.

Table 5-1
Existing Plus Phase 1 Project Peak Hour Intersection LOS Summary

#	Intersection	Traffic Control	Peak Hour	Existing Conditions		Existing Plus Phase 1 Project		Change in Delay	Signifi-cant?
				Delay [a]	LOS [b]	Delay [a]	LOS [b]		
1	Cannon Road & Mystra Way	Signal	AM	13.9	B	14.0	B	0.1	No
			PM	13.0	B	13.0	B	0.0	No
			Sunday	14.3	B	14.5	B	0.2	No
2	Cannon Road & Driveway 1	OWSC	AM	Does Not Exist		9.5	A	-	No
			PM			8.9	A	-	No
			Sunday			9.4	A	-	No
3	Cannon Road & Driveway 2	OWSC	AM	Does Not Exist		9.5	A	-	No
			PM			8.9	A	-	No
			Sunday			9.3	A	-	No
4	Mystra Way & Driveway 3	OWSC	AM	Does Not Exist		9.9	A	-	No
			PM			9.0	A	-	No
			Sunday			9.7	A	-	No

Notes: OWSC = One-Way Stop Controlled
[a] Delays are reported as the average control delay for the entire intersection at signalized intersections and the worst movement at unsignalized intersections.
[b] LOS calculations are based on the methodology outlined in the *2000 Highway Capacity Manual* (HCM) and performed using Synchro 9.



RICK ENGINEERING COMPANY

Figure 5-1
Existing Plus Phase 1 Project Traffic Volumes

5.3 Roadway Segment Analysis

Table 5-2 summarizes the daily operations of the study area roadway segments under Existing Plus Phase 1 Project Conditions. As shown in the table, the two study roadway segments are expected to operate at an acceptable LOS A with the addition of project-related traffic to existing daily traffic volumes. Therefore, no significant impacts were identified on the study roadway segments and no mitigation measures are required.

Table 5-2
Existing Plus Phase 1 Project Roadway Segment LOS Summary

Roadway Segment	LOS E Capacity [(a)]	Existing			Existing Plus Phase 1 Project			Change in V/C	Sig?
		ADT	v/c Ratio	LOS	ADT	v/c Ratio	LOS		
Weekday Daily Operations									
Mystra Way, North of Cannon Road	10,000	1,762	0.117	A	1,828	0.122	A	0.004	No
Cannon Road, Mystra Way to Wisteria Drive	40,000	4,583	0.115	A	4,952	0.124	A	0.009	No
Sunday Daily Operations									
Mystra Way, North of Cannon Road	10,000	953	0.064	A	994	0.066	A	0.003	No
Cannon Road, Mystra Way to Wisteria Drive	40,000	2,896	0.072	A	3,124	0.078	A	0.006	No

Notes:
[(a)] Capacity values and corresponding LOS based on Table 3-3 in the City of Oceanside General Plan Circulation Element.

6 EXISTING PLUS PROJECT BUILDOUT CONDITIONS

This section provides a summary of operations at the study area intersections and roadway segments with the addition of Project Buildout traffic (Phases 1 and 2) to existing traffic volumes.

6.1 Traffic Volumes

Figure 6-1 illustrates the Existing Plus Project Buildout peak hour and daily traffic volumes at the study area intersections and roadway segments.

6.2 Intersection Analysis

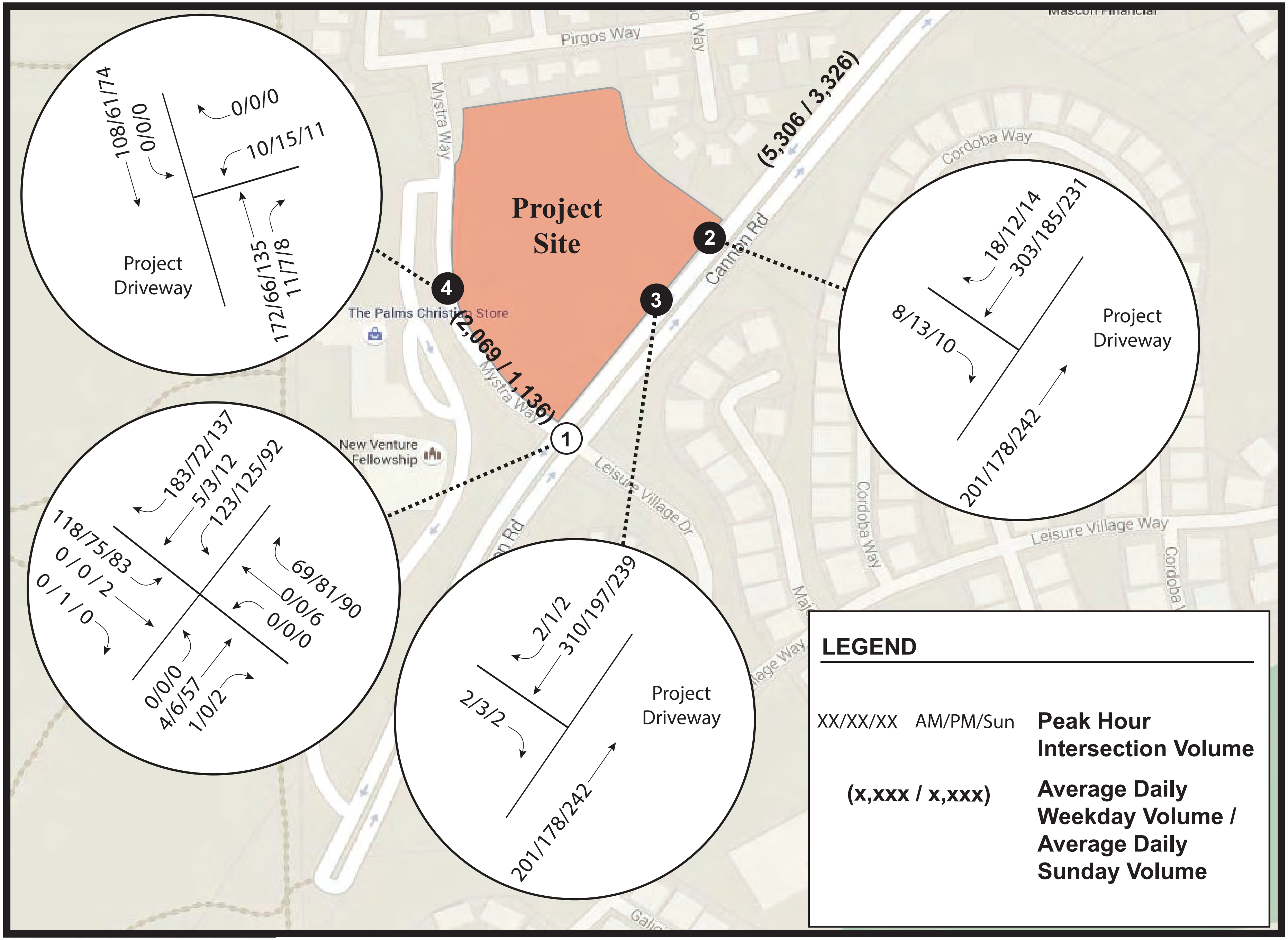
Table 6-1 displays the LOS analysis results for the study intersections under the Existing Plus Project Buildout scenario. As shown in the table, the study intersections are expected to operate at an acceptable LOS B or better with the addition of Project Buildout traffic to existing traffic volumes during the weekday AM and PM peak hours and the Sunday peak hour.

Appendix B contains the intersection LOS worksheets.

Table 6-1
Existing Plus Project Buildout Peak Hour Intersection LOS Summary

#	Intersection	Traffic Control	Peak Hour	Existing Conditions		Existing Plus Project Buildout		Change in Delay	Signifi-cant?
				Delay [a]	LOS [b]	Delay [a]	LOS [b]		
1	Cannon Road & Mystra Way	Signal	AM	13.9	B	14.1	B	0.2	No
			PM	13.0	B	13.1	B	0.1	No
			Sunday	14.3	B	16.2	B	1.9	No
2	Cannon Road & Driveway 1	OWSC	AM	Does Not Exist		9.6	A	-	No
			PM			9.0	A	-	No
			Sunday			9.4	A	-	No
3	Cannon Road & Driveway 2	OWSC	AM	Does Not Exist		9.6	A	-	No
			PM			8.9	A	-	No
			Sunday			9.4	A	-	No
4	Mystra Way & Driveway 3	OWSC	AM	Does Not Exist		9.9	A	-	No
			PM			9.1	A	-	No
			Sunday			9.7	A	-	No

Notes: OWSC = One-Way Stop Controlled
[a] Delays are reported as the average control delay for the entire intersection at signalized intersections and the worst movement at unsignalized intersections.
[b] LOS calculations are based on the methodology outlined in the *2000 Highway Capacity Manual* (HCM) and performed using Synchro 9.



RICK ENGINEERING COMPANY

Figure 6-1
Existing Plus Project Buildout Traffic Volumes

6.3 Roadway Segment Analysis

Table 6-2 summarizes the daily operations of the study area roadway segments under Existing Plus Project Buildout Conditions. As shown in the table, the two study roadway segments are expected to operate at an acceptable LOS A with the addition of project-related traffic to existing daily traffic volumes. Therefore, no significant impacts were identified on the study roadway segments and no mitigation measures are required.

Table 6-2
Existing Plus Project Buildout Roadway Segment LOS Summary

Roadway Segment	LOS E Capacity	Existing			Existing Plus Project Buildout			Change in V/C	Sig?
		ADT	v/c Ratio	LOS	ADT	v/c Ratio	LOS		
Weekday Daily Operations									
Mystra Way, North of Cannon Road	10,000	1,762	0.117	A	2,069	0.138	A	0.020	No
Cannon Road, Mystra Way to Wisteria Drive	40,000	4,583	0.115	A	5,306	0.133	A	0.018	No
Sunday Daily Operations									
Mystra Way, North of Cannon Road	10,000	953	0.064	A	1,136	0.076	A	0.012	No
Cannon Road, Mystra Way to Wisteria Drive	40,000	2,896	0.072	A	3,326	0.083	A	0.011	No

Notes:
[a] Capacity values and corresponding LOS based on Table 3-3 in the City of Oceanside General Plan Circulation Element.

7 QUEUING ANALYSIS

A queuing analysis was performed for the Cannon Road/Mystra Way intersection during the weekday AM/PM peak hours and the Sunday peak hour under Existing and Existing Plus Project Buildout conditions. The purpose of the queuing analysis was to determine if existing queues would potentially block access to the project driveways or if the addition of project traffic would result in queues exceeding the existing storage lane capacities at the Cannon Road/Mystra Way intersection.

The Synchro 9 software program was used to perform the queuing analysis. The queuing analysis results are based on the 95th percentile queue lengths in feet for each turning movement.

Table 7-1 displays the Existing and Existing Plus Project Buildout queue lengths at the Cannon Road/Mystra Way intersection during the weekday AM/PM and Sunday AM peak hours. The Synchro queuing worksheets are provided in **Appendix C.**

As shown in the table, the 95th percentile queue lengths are not forecast to exceed the available storage lengths during the peak hours under either Existing or Existing Plus Project Buildout conditions.

Table 7-1
Peak Hour Intersection Queuing Analysis

Intersection	Lane/Movement	No. of Lanes / Storage Length [(1)]	AM Peak Hour		PM Peak Hour		Sunday Peak Hour	
			Volume	Queue Length [(2)]	*Volume*	Queue Length [(2)]	*Volume*	Queue Length [(2)]
Existing Conditions								
Cannon Rd. / Mystra Way	EB Left-Turn	1 / 140’	*0*	0’	*1*	4’	*0*	0’
	EB Through/Right-Turn (shared)	2 / NA	*5*	4’	*6*	5’	*59*	23’
	WB Left-Turn	1 / 155’	*113*	70’	*109*	70’	*80*	56’
	WB Through/Right-Turn (shared)	2 / NA	*177*	8’	*68*	0’	*141*	6’
	NB Left-Turn/Through (shared)	1 / NA	*0*	0’	*0*	0’	*6*	10’
	NB Right-Turn	1 / 95’	*69*	0’	*81*	0’	*90*	15’
	SB Left-Turn	1 / 250’	*54*	44’	*30*	29’	*37*	34’
	SB Left-Turn/Through (shared)	1 / NA	*54*	44’	*30*	30’	*37*	34’
	SB Right-Turn	1 / 60’	*0*	0’	*1*	0’	*0*	0’
Existing Plus Project Buildout Conditions								
Cannon Rd. / Mystra Way	EB Left-Turn	1 / 140’	*0*	0’	*1*	4’	*0*	0’
	EB Through/Right-Turn (shared)	2 / NA	*5*	4’	*6*	5’	*59*	24’
	WB Left-Turn	1 / 155’	*123*	76’	*125*	79’	*92*	64’
	WB Through/Right-Turn (shared)	2 / NA	*188*	8’	*75*	0’	*149*	6’
	NB Left-Turn/Through (shared)	1 / NA	*0*	0’	*0*	0’	*6*	10’
	NB Right-Turn	1 / 95’	*69*	0’	*81*	0’	*90*	15’
	SB Left-Turn	1 / 250’	*59*	47’	*37*	35’	*42*	38’
	SB Left-Turn/Through (shared)	1 / NA	*59*	47’	*38*	35’	*43*	40’
	SB Right-Turn	1 / 60’	*0*	0’	*1*	0’	*0*	0’

NA = Not Applicable. No storage bay provided for this turning movement(s).
(1) Storage lengths expressed in feet.
(2) Queue lengths expressed in feet.

8 SITE ACCESS, CIRCULATION AND PARKING

8.1 Site Access and Circulation

Phase 1 Project (South Parcel)
The Phase 1 project will take access from two driveways on Cannon Road and one driveway on Mystra Way. In Phase 1, the driveway on Mystra Way will provide access to nine (9) parking spaces near the rear of the building and will terminate along the northern boundary of the Phase 1 site. The easterly driveway on Cannon Road will provide access to the remaining 41 parking spaces along the east side and front of the Phase 1 building. The westerly driveway on Cannon Road will provide direct access to the passenger unloading area near the main entrance, and the parking spaces located directly in front of the Phase 1 building. Full access will be provided at the Mystra Way driveway, and the two driveways on Cannon Road will be restricted to right-in/right-out access.

Phase 2 Project (North Parcel)
The Phase 2 project will take access from the driveway on Mystra Way and the easterly driveway on Cannon Road. These two driveways will connect to drive aisles on the Phase 2 site that will provide access to the 103 parking spaces that will be provided on the Phase 2 site.

8.2 Parking Assessment

The City of Oceanside's Off-Street Parking Requirements requires 1 parking space per 3 beds for a "Residential Care, Limited" use, which is synonymous with a senior assisted living use. Based on the City's parking rate, the Phase 1 project is required to provide a minimum of 41 parking spaces and the combined Phase 1 and Phase 2 projects are required to provide a minimum of 81 parking spaces.

The Phase 1 project will provide 50 parking spaces, which exceeds the City's minimum requirement by 9 parking spaces. At Project Buildout, the combined Phase 1 and Phase 2 projects will provide 153 parking spaces, which exceed the City's minimum requirement by 72 parking spaces.

9 SUMMARY AND CONCLUSIONS

This focused traffic impact study evaluated the traffic conditions associated with the proposed Ocean Hills Senior Living Phase 2 Facility located at the northeast corner of the intersection of Cannon Road and Mystra Way in the City of Oceanside. The Phase 2 project will consist of a three-story, 100,177 square-foot senior living facility that will be built on the northerly half of the 6.46-acre development site. The Phase 1 facility is currently under construction and will provide assisted living and memory care. The proposed Phase 2 facility will provide 101 independent senior residential units, for a total of 215 residential units for both development phases.

Due to the project site being in close proximity to New Venture Christian Fellowship Church, Sunday traffic conditions were also evaluated. The combined Phase 1 and Phase 2 developments (project buildout) are estimated to generate a total of 723 weekday trips, including 51 AM peak hour trips and 51 PM peak hour trips. The combined Phase 1/Phase 2 projects are estimated to generate a total of 430 Sunday trips, including 47 trips during the Sunday peak hour.

The analysis results showed that the study intersections and roadway segments will operate at an acceptable LOS B or better through Existing Plus Project Buildout conditions (Phases 1 and 2). Therefore, no significant impacts were identified and no mitigation measures are required.

The results of the queuing analysis that was conducted at the Cannon Road/Mystra Way intersection showed that the weekday and Sunday peak hour 95th percentile queue lengths are not forecast to exceed the available storage lane capacities under either Existing or Existing Plus Project Buildout conditions.

The project will take access from two driveways on Cannon Road and one driveway on Mystra Way for both phases of development. The two driveways on Cannon Road will be restricted to right-in/right-out access, and full access will be provided for the proposed driveway on Mystra Way. The easterly driveway on Cannon Road and Mystra Way will provide access to both the Phase 1 and Phase 2 sites, while the westerly driveway on Cannon Road will provide access to parking near the main entrance of the Phase 1 building.

The Phase 1 project is required to provide a minimum of 41 parking spaces, and the combined Phase 1 and 2 projects (Project Buildout) is required to provide a minimum of 81 parking spaces. A total of 50 parking spaces will be provided for the Phase 1 project, and a total of 153 spaces will be provided for the project at buildout (combined Phases 1 and 2). Therefore, the proposed number of parking spaces provided will exceed the City's minimum parking requirements for the project.

APPENDIX A

Traffic Count Data

National Data & Surveying Services

Intersection Turning Movement Count

Location: Mystra Way & Cannon Rd
City: Oceanside
Control: Signalized

Project ID: 18-04357-001
Date: 10/2/2018

Total

NS/EW Streets:	Mystra Way				Mystra Way				Cannon Rd				Cannon Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1.5	0.5	1	0	1	2	0	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	10	0	16	0	0	0	0	1	0	0	11	1	11	0	50
7:15 AM	0	0	7	0	12	0	0	0	0	0	0	0	13	1	12	0	45
7:30 AM	0	0	10	0	17	0	0	0	0	1	0	0	21	0	16	0	65
7:45 AM	0	0	6	0	12	0	0	0	0	3	0	0	38	0	21	0	80
8:00 AM	0	0	16	0	15	0	0	0	0	0	0	0	21	1	18	0	71
8:15 AM	0	0	15	0	12	0	0	0	0	1	0	0	28	1	34	0	91
8:30 AM	0	0	17	0	45	0	0	0	0	0	0	0	27	2	71	0	162
8:45 AM	0	0	21	0	36	0	0	0	0	3	1	0	37	1	49	0	148
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	102	0	165	0	0	0	0	9	1	0	196	7	232	0	712
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	90.00%	10.00%	0.00%	45.06%	1.61%	53.33%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	0	69	0	108	0	0	0	0	4	1	0	113	5	172	0	472
PEAK HR FACTOR :	0.000	0.000	0.821	0.000	0.600	0.000	0.000	0.000	0.000	0.333	0.250	0.000	0.764	0.625	0.606	0.000	0.728
	0.821				0.600				0.313				0.725				

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	0	1	1	0	1.5	0.5	1	0	1	2	0	0	1	2	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	24	0	22	0	0	0	0	1	0	0	27	0	16	0	90
4:15 PM	0	0	22	0	17	0	0	0	0	2	0	0	39	2	9	0	91
4:30 PM	0	0	19	0	11	0	1	0	1	0	0	0	22	1	21	0	76
4:45 PM	0	0	16	0	10	0	0	0	0	3	0	0	21	0	19	0	69
5:00 PM	0	0	18	0	28	0	0	0	0	3	0	0	17	3	17	0	86
5:15 PM	0	0	15	0	13	0	0	0	0	0	0	0	25	0	21	0	74
5:30 PM	0	0	10	0	20	0	0	0	0	2	0	0	22	1	16	0	71
5:45 PM	0	0	9	0	21	0	0	0	0	1	0	0	20	1	10	0	62
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	133	0	142	0	1	0	1	12	0	0	193	8	129	0	619
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%	99.30%	0.00%	0.70%	0.00%	7.69%	92.31%	0.00%	0.00%	58.48%	2.42%	39.09%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	81	0	60	0	1	0	1	6	0	0	109	3	65	0	326
PEAK HR FACTOR :	0.000	0.000	0.844	0.000	0.682	0.000	0.250	0.000	0.250	0.500	0.000	0.000	0.699	0.375	0.774	0.000	0.896
	0.844				0.693				0.583				0.885				

Prepared by National Data & Surveying Services

Mystra Way & Cannon Rd

Peak Hour Turning Movement Count

ID: 18-04357-001
City: Oceanside

Day: Tuesday
Date: 10/02/2018

	PEAK HOURS	COUNT PERIODS
AM	08:00 AM - 09:00 AM	07:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:00 PM - 05:00 PM	04:00 PM - 06:00 PM

Mystra Way — SOUTHBOUND

	U-turn	Left	Through	Right	Departing
AM	0	0	108	0	172
NOON	0	0	0	0	0
PM	1	0	60	0	66
Bikes	1	0.5	1.5	0	

Cannon Rd — EASTBOUND

Movement	AM	NOON	PM	Bikes
Departing	5	0	4	
U-turn	0	0	0	0
Left	0	0	1	1
Through	4	0	6	2
Right	1	0	0	0

Cannon Rd — WESTBOUND

Movement	Bikes	PM	NOON	AM
Left	0	65	0	172
Through	2	3	0	5
Right	1	109	0	113
U-turn	0	0	0	0
Departing		147	0	181

CONTROL

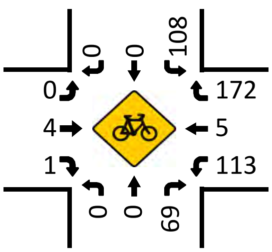
Signalized

	AM	NOON	PM
TEV	472	0	326
PHF	0.73		0.90

Mystra Way — NORTHBOUND

	Departing	U-turn	Left	Through	Right
Bikes		0	0	1	1
PM	109	0	0	0	81
NOON	0	0	0	0	0
AM	114	0	0	0	69

Total Vehicles (AM)



	U-turn	Left	Through	Right
Southbound	0	0	108	
Eastbound		0	4	1
Westbound		172	5	113
Northbound	0	0	69	

Total Vehicles (Noon)

Southbound	N/A	N/A	N/A
Eastbound	N/A	N/A	N/A
Westbound	N/A	N/A	N/A
Northbound	N/A	N/A	N/A

Total Vehicles (PM)

Southbound	1	0	60
Eastbound	1	6	0
Westbound	65	3	109
Northbound	0	0	81

Total Vehicles (AM)

Southbound	0	0	108
Eastbound	0	4	1
Westbound	172	5	113
Northbound	0	0	69

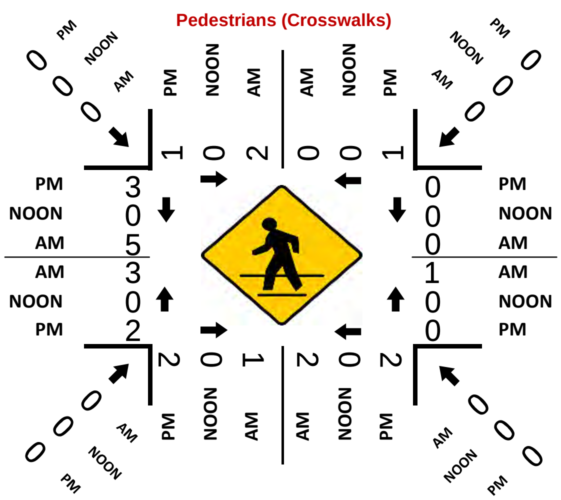
Total Vehicles (Noon)

Southbound	N/A	N/A	N/A
Eastbound	N/A	N/A	N/A
Westbound	N/A	N/A	N/A
Northbound	N/A	N/A	N/A

Total Vehicles (PM)

Southbound	1	0	60
Eastbound	1	6	0
Westbound	65	3	109
Northbound	0	0	81

Pedestrians (Crosswalks)



Crosswalk	Direction	AM	NOON	PM
North	Eastward	2	0	1
North	Westward	0	0	1
West	Southward	5	0	3
West	Northward	3	0	2
East	Southward	0	0	0
East	Northward	1	0	0
South	Eastward	1	0	2
South	Westward	2	0	2
Diagonals (each corner)		0	0	0

National Data & Surveying Services

Intersection Turning Movement Count

Location: Cannon Rd & Mystra Way
City: Oceanside
Control: Signalized

Project ID: 18-04357-001
Date: 10/7/2018

Total

NS/EW Streets:	Cannon Rd				Cannon Rd				Mystra Way				Mystra Way				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	0	0	1.5	0.5	1	0	0	1	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
9:00 AM	0	0	0	0	9	0	11	0	7	0	0	0	0	0	17	0	44
9:15 AM	0	1	0	0	8	2	14	0	3	0	0	0	0	0	17	0	45
9:30 AM	0	0	0	0	9	0	10	0	9	0	0	0	0	1	15	0	44
9:45 AM	0	1	0	0	16	1	19	0	7	0	0	0	0	0	15	0	59
10:00 AM	0	4	0	0	18	0	24	0	8	1	0	0	0	0	34	0	89
10:15 AM	0	37	0	0	15	6	44	0	43	1	0	0	0	2	29	0	177
10:30 AM	0	12	1	0	18	2	36	0	16	0	0	0	0	2	17	0	104
10:45 AM	0	4	1	0	29	4	25	0	5	0	0	0	0	2	10	0	80
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	59	2	0	122	15	183	0	98	2	0	0	0	7	154	0	642
APPROACH %'s :	0.00%	96.72%	3.28%	0.00%	38.13%	4.69%	57.19%	0.00%	98.00%	2.00%	0.00%	0.00%	0.00%	4.35%	95.65%	0.00%	
PEAK HR :	10:00 AM - 11:00 AM																TOTAL
PEAK HR VOL :	0	57	2	0	80	12	129	0	72	2	0	0	0	6	90	0	450
PEAK HR FACTOR :	0.000	0.385	0.500	0.000	0.690	0.500	0.733	0.000	0.419	0.500	0.000	0.000	0.000	0.750	0.662	0.000	0.636
	0.399				0.850				0.420				0.706				

Prepared by National Data & Surveying Services

Cannon Rd & Mystra Way

Peak Hour Turning Movement Count

ID: 18-04357-001
City: Oceanside

Day: Sunday
Date: 10/07/2018

PEAK HOURS		COUNT PERIODS
AM	10:00 AM - 11:00 AM	09:00 AM - 11:00 AM
NOON	NONE	NONE
PM	NONE	NONE

Cannon Rd SOUTHBOUND

	Right	Through	Left	U-Turn	Out
AM	129	12	80	0	219
NOON	0	0	0	0	0
PM	0	0	0	0	0
	0	2	1	0	

Mystra Way EASTBOUND

	AM	NOON	PM	
Out	135	0	0	
U-Turn	0	0	0	0
Left	72	0	0	1.5
Through	2	0	0	0.5
Right	0	0	0	1

Mystra Way WESTBOUND

		PM	NOON	AM
Right	1	0	0	90
Through	1	0	0	6
Left	0	0	0	0
U-Turn	0	0	0	0
Out		0	0	84

Cannon Rd NORTHBOUND

	Out	U-Turn	Left	Through	Right
		0	1	2	0
PM	0	0	0	0	0
NOON	0	0	0	0	0
AM	12	0	0	57	2

CONTROL

Signalized

	AM	NOON	PM
TEV	450	0	0
PHF	0.64		

Total Vehicles (AM)

	Right	Through	Left
Southbound	129	12	80
Eastbound	0	2	72
Westbound	90	6	0
Northbound	2	57	0

Total Vehicles (Noon)

All movements: N/A

Total Vehicles (PM)

All movements: N/A

Bikes (AM)

All movements: 0

Bikes (NOON)

All movements: N/A

Bikes (PM)

All movements: N/A

Pedestrians (Crosswalks)

Crosswalk	AM	NOON	PM
North (west half)	0	0	0
North (east half)	0	0	0
West (north half)	1	0	0
West (south half)	0	0	0
East (north half)	0	0	0
East (south half)	0	0	0
South (west half)	0	0	0
South (east half)	3	0	0
NW diagonal	0	0	0
NE diagonal	0	0	0
SW diagonal	0	0	0
SE diagonal	0	0	0

Prepared by NDS/ATD

VOLUME

Cannon Rd N/O Mystra Way

Day: Tuesday
Date: 10/2/2018

City: Oceanside
Project #: CA18_4358_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	2,130	2,453	4,583

AM Period	NB		SB		EB		WB		TOTAL	
00:00					1		2		3	
00:15					0		0		0	
00:30					0		0		0	
00:45					0	1	0	2	0	3
01:00					1		1		2	
01:15					1		0		1	
01:30					0		1		1	
01:45					0	2	1	3	1	5
02:00					0		0		0	
02:15					0		4		4	
02:30					1		2		3	
02:45					1	2	0	6	1	8
03:00					0		0		0	
03:15					1		0		1	
03:30					1		1		2	
03:45					1	3	1	2	2	5
04:00					3		1		4	
04:15					1		2		3	
04:30					2		2		4	
04:45					3	9	2	7	5	16
05:00					2		1		3	
05:15					5		2		7	
05:30					2		4		6	
05:45					7	16	14	21	21	37
06:00					7		4		11	
06:15					7		21		28	
06:30					11		17		28	
06:45					15	40	33	75	48	115
07:00					26		22		48	
07:15					31		26		57	
07:30					28		38		66	
07:45					16	101	49	135	65	236
08:00					29		52		81	
08:15					22		69		91	
08:30					63		109		172	
08:45					83	197	73	303	156	500
09:00					53		31		84	
09:15					26		36		62	
09:30					38		33		71	
09:45					38	155	33	133	71	288
10:00					41		38		79	
10:15					28		37		65	
10:30					38		43		81	
10:45					39	146	42	160	81	306
11:00					38		35		73	
11:15					42		39		81	
11:30					36		51		87	
11:45					42	158	53	178	95	336
TOTALS						830		1025		**1855**
SPLIT %						44.7%		55.3%		**40.5%**

PM Period	NB		SB		EB		WB		TOTAL	
12:00					44		48		92	
12:15					55		56		111	
12:30					27		37		64	
12:45					38	164	36	177	74	341
13:00					44		38		82	
13:15					40		45		85	
13:30					38		32		70	
13:45					49	171	49	164	98	335
14:00					44		44		88	
14:15					39		51		90	
14:30					35		53		88	
14:45					39	157	69	217	108	374
15:00					61		53		114	
15:15					35		74		109	
15:30					127		81		208	
15:45					60	283	44	252	104	535
16:00					54		40		94	
16:15					44		46		90	
16:30					34		42		76	
16:45					32	164	39	167	71	331
17:00					48		42		90	
17:15					28		42		70	
17:30					36		39		75	
17:45					31	143	27	150	58	293
18:00					35		23		58	
18:15					20		35		55	
18:30					21		27		48	
18:45					15	91	23	108	38	199
19:00					10		27		37	
19:15					9		22		31	
19:30					7		13		20	
19:45					9	35	14	76	23	111
20:00					10		13		23	
20:15					10		16		26	
20:30					15		12		27	
20:45					10	45	13	54	23	99
21:00					11		11		22	
21:15					6		10		16	
21:30					8		8		16	
21:45					2	27	4	33	6	60
22:00					5		6		11	
22:15					2		3		5	
22:30					0		4		4	
22:45					2	9	9	22	11	31
23:00					4		2		6	
23:15					3		4		7	
23:30					2		1		3	
23:45					2	11	1	8	3	19
TOTALS						1300		1428		**2728**
SPLIT %						47.7%		52.3%		**59.5%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	2,130	2,453	4,583

	NB	SB	EB	WB	TOTAL
AM Peak Hour			08:30	08:00	**08:15**
AM Pk Volume			225	303	**503**
Pk Hr Factor			0.678	0.695	**0.731**
7 - 9 Volume	0	0	298	438	**736**
7 - 9 Peak Hour			08:00	08:00	**08:00**
7 - 9 Pk Volume	0	0	197	303	**500**
Pk Hr Factor	0.000	0.000	0.593	0.695	**0.727**

	NB	SB	EB	WB	TOTAL
PM Peak Hour			15:30	14:45	**14:45**
PM Pk Volume			285	277	**539**
Pk Hr Factor			0.561	0.855	**0.648**
4 - 6 Volume	0	0	307	317	**624**
4 - 6 Peak Hour			16:00	16:15	**16:00**
4 - 6 Pk Volume	0	0	164	169	**331**
Pk Hr Factor	0.000	0.000	0.759	0.918	**0.880**

Prepared by NDS/ATD

VOLUME

Cannon Rd N/O Mystra Way

Day: Sunday
Date: 10/7/2018

City: Oceanside
Project #: CA18_4358_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,359	1,537	2,896

AM Period	NB	SB	EB		WB		TOTAL		PM Period	NB	SB	EB		WB		TOTAL	
00:00			1		2		3		12:00			60		40		100	
00:15			2		2		4		12:15			91		25		116	
00:30			0		2		2		12:30			45		31		76	
00:45			1	4	1	7	2	11	12:45			40	236	32	128	72	364
01:00			0		1		1		13:00			23		30		53	
01:15			2		2		4		13:15			28		25		53	
01:30			1		2		3		13:30			31		23		54	
01:45			1	4	2	7	3	11	13:45			20	102	39	117	59	219
02:00			0		0		0		14:00			20		30		50	
02:15			1		3		4		14:15			20		17		37	
02:30			1		2		3		14:30			23		25		48	
02:45			1	3	0	5	1	8	14:45			22	85	35	107	57	192
03:00			1		1		2		15:00			18		22		40	
03:15			1		1		2		15:15			22		19		41	
03:30			0		0		0		15:30			15		29		44	
03:45			1	3	0	2	1	5	15:45			31	86	29	99	60	185
04:00			0		0		0		16:00			30		26		56	
04:15			0		3		3		16:15			20		30		50	
04:30			1		1		2		16:30			20		23		43	
04:45			4	5	0	4	4	9	16:45			27	97	26	105	53	202
05:00			0		2		2		17:00			18		20		38	
05:15			0		2		2		17:15			19		23		42	
05:30			0		3		3		17:30			13		31		44	
05:45			5	5	2	9	7	14	17:45			20	70	23	97	43	167
06:00			5		3		8		18:00			15		22		37	
06:15			2		6		8		18:15			11		18		29	
06:30			4		12		16		18:30			15		18		33	
06:45			5	16	12	33	17	49	18:45			11	52	23	81	34	133
07:00			12		4		16		19:00			11		11		22	
07:15			7		3		10		19:15			7		17		24	
07:30			15		9		24		19:30			11		7		18	
07:45			10	44	25	41	35	85	19:45			10	39	17	52	27	91
08:00			16		17		33		20:00			6		10		16	
08:15			23		48		71		20:15			6		3		9	
08:30			23		46		69		20:30			4		6		10	
08:45			17	79	32	143	49	222	20:45			5	21	7	26	12	47
09:00			20		28		48		21:00			2		4		6	
09:15			28		28		56		21:15			2		5		7	
09:30			27		22		49		21:30			1		6		7	
09:45			16	91	37	115	53	206	21:45			2	7	4	19	6	26
10:00			103		38		141		22:00			2		3		5	
10:15			52		48		100		22:15			0		7		7	
10:30			31		54		85		22:30			1		3		4	
10:45			23	209	50	190	73	399	22:45			2	5	5	18	7	23
11:00			26		43		69		23:00			3		3		6	
11:15			23		26		49		23:15			0		3		3	
11:30			26		23		49		23:30			1		0		1	
11:45			17	92	33	125	50	217	23:45			0	4	1	7	1	11
TOTALS				555		681		**1236**	**TOTALS**				804		856		**1660**
SPLIT %				44.9%		55.1%		**42.7%**	**SPLIT %**				48.4%		51.6%		**57.3%**

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	1,359	1,537	2,896

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour			11:45	10:15	**10:00**	**PM Peak Hour**			12:00	12:00	**12:00**
AM Pk Volume			213	195	**399**	**PM Pk Volume**			236	128	**364**
Pk Hr Factor			0.585	0.903	**0.707**	**Pk Hr Factor**			0.648	0.800	**0.784**
7 - 9 Volume	0	0	123	184	**307**	**4 - 6 Volume**	0	0	167	202	**369**
7 - 9 Peak Hour			08:00	08:00	**08:00**	**4 - 6 Peak Hour**			16:00	16:00	**16:00**
7 - 9 Pk Volume	0	0	79	143	**222**	**4 - 6 Pk Volume**	0	0	97	105	**202**
Pk Hr Factor	0.000	0.000	0.859	0.745	**0.782**	**Pk Hr Factor**	0.000	0.000	0.808	0.875	**0.902**

Prepared by NDS/ATD

VOLUME

Mystra Way W/O Cannon Rd

Day: Tuesday
Date: 10/2/2018

City: Oceanside
Project #: CA18_4358_002

DAILY TOTALS	NB	SB	EB	WB	Total
	900	862	0	0	1,762

AM Period	NB		SB		EB	WB	TOTAL	
00:00	1		1				2	
00:15	0		0				0	
00:30	0		0				0	
00:45	0	1	0	1			0	2
01:00	0		0				0	
01:15	0		0				0	
01:30	0		0				0	
01:45	0		0				0	
02:00	0		0				0	
02:15	0		0				0	
02:30	1		2				3	
02:45	0	1	1	3			1	4
03:00	0		0				0	
03:15	0		0				0	
03:30	0		0				0	
03:45	0		0				0	
04:00	0		2				2	
04:15	0		0				0	
04:30	1		1				2	
04:45	1	2	1	4			2	6
05:00	0		1				1	
05:15	1		2				3	
05:30	0		0				0	
05:45	3	4	5	8			8	12
06:00	0		3				3	
06:15	0		4				4	
06:30	6		6				12	
06:45	11	17	6	19			17	36
07:00	5		14				19	
07:15	10		14				24	
07:30	16		12				28	
07:45	21	52	6	46			27	98
08:00	22		11				33	
08:15	41		15				56	
08:30	80		51				131	
08:45	46	189	59	136			105	325
09:00	6		27				33	
09:15	4		8				12	
09:30	12		9				21	
09:45	6	28	10	54			16	82
10:00	9		12				21	
10:15	8		5				13	
10:30	10		7				17	
10:45	9	36	9	33			18	69
11:00	5		11				16	
11:15	7		9				16	
11:30	11		8				19	
11:45	9	32	12	40			21	72
TOTALS		362		344				706
SPLIT %		51.3%		48.7%				40.1%

PM Period	NB		SB		EB	WB	TOTAL	
12:00	10		11				21	
12:15	9		8				17	
12:30	13		8				21	
12:45	11	43	10	37			21	80
13:00	13		7				20	
13:15	10		11				21	
13:30	4		11				15	
13:45	15	42	13	42			28	84
14:00	13		15				28	
14:15	21		9				30	
14:30	19		12				31	
14:45	31	84	14	50			45	134
15:00	20		34				54	
15:15	54		13				67	
15:30	53		94				147	
15:45	13	140	28	169			41	309
16:00	14		22				36	
16:15	8		15				23	
16:30	22		14				36	
16:45	20	64	11	62			31	126
17:00	18		27				45	
17:15	20		12				32	
17:30	16		21				37	
17:45	10	64	20	80			30	144
18:00	7		15				22	
18:15	12		6				18	
18:30	7		4				11	
18:45	12	38	4	29			16	67
19:00	11		4				15	
19:15	10		3				13	
19:30	4		2				6	
19:45	2	27	0	9			2	36
20:00	6		2				8	
20:15	5		1				6	
20:30	8		13				21	
20:45	2	21	7	23			9	44
21:00	2		4				6	
21:15	2		4				6	
21:30	4		4				8	
21:45	0	8	0	12			0	20
22:00	1		3				4	
22:15	1		0				1	
22:30	3		1				4	
22:45	0	5	0	4			0	9
23:00	0		0				0	
23:15	1		0				1	
23:30	1		0				1	
23:45	0	2	1	1			1	3
TOTALS		538		518				1056
SPLIT %		50.9%		49.1%				59.9%

DAILY TOTALS	NB	SB	EB	WB	Total
	900	862	0	0	1,762

	NB	SB	EB	WB	Total
AM Peak Hour	08:00	08:15			08:00
AM Pk Volume	189	152			325
Pk Hr Factor	0.591	0.644			0.620
7 - 9 Volume	241	182	0	0	423
7 - 9 Peak Hour	08:00	08:00			08:00
7 - 9 Pk Volume	189	136	0	0	325
Pk Hr Factor	0.591	0.576	0.000	0.000	0.620

	NB	SB	EB	WB	Total
PM Peak Hour	14:45	15:00			14:45
PM Pk Volume	158	169			313
Pk Hr Factor	0.731	0.449			0.532
4 - 6 Volume	128	142	0	0	270
4 - 6 Peak Hour	16:30	17:00			16:45
4 - 6 Pk Volume	80	80	0	0	145
Pk Hr Factor	0.909	0.741	0.000	0.000	0.806

Prepared by NDS/ATD

VOLUME

Mystra Way W/O Cannon Rd

Day: Sunday
Date: 10/7/2018

City: Oceanside
Project #: CA18_4358_002

DAILY TOTALS	NB	SB	EB	WB	Total
	530	423	0	0	953

AM Period	NB		SB		EB	WB	TOTAL	
00:00	1		1				2	
00:15	1		1				2	
00:30	1		0				1	
00:45	0	3	0	2			0	5
01:00	0		0				0	
01:15	0		0				0	
01:30	0		0				0	
01:45	0		0				0	
02:00	0		0				0	
02:15	0		0				0	
02:30	0		1				1	
02:45	0		0	1			0	1
03:00	1		1				2	
03:15	1		1				2	
03:30	0		0				0	
03:45	0	2	1	3			1	5
04:00	0		0				0	
04:15	0		0				0	
04:30	0		0				0	
04:45	0		1	1			1	1
05:00	0		0				0	
05:15	0		0				0	
05:30	1		0				1	
05:45	0	1	1	1			1	2
06:00	1		1				2	
06:15	2		0				2	
06:30	2		0				2	
06:45	3	8	1	2			4	10
07:00	0		3				3	
07:15	0		5				5	
07:30	4		6				10	
07:45	8	12	3	17			11	29
08:00	13		3				16	
08:15	39		3				42	
08:30	40		5				45	
08:45	23	115	6	17			29	132
09:00	14		4				18	
09:15	17		11				28	
09:30	8		7				15	
09:45	15	54	5	27			20	81
10:00	20		48				68	
10:15	33		18				51	
10:30	44		4				48	
10:45	34	131	5	75			39	206
11:00	18		7				25	
11:15	6		4				10	
11:30	5		7				12	
11:45	9	38	9	27			18	65
TOTALS		364		173				**537**
SPLIT %		67.8%		32.2%				**56.3%**

PM Period	NB		SB		EB	WB	TOTAL	
12:00	7		41				48	
12:15	8		65				73	
12:30	7		17				24	
12:45	8	30	17	140			25	170
13:00	4		7				11	
13:15	4		8				12	
13:30	2		7				9	
13:45	6	16	1	23			7	39
14:00	2		4				6	
14:15	1		3				4	
14:30	8		5				13	
14:45	5	16	7	19			12	35
15:00	2		6				8	
15:15	5		5				10	
15:30	6		6				12	
15:45	6	19	6	23			12	42
16:00	4		2				6	
16:15	6		1				7	
16:30	6		5				11	
16:45	3	19	2	10			5	29
17:00	4		5				9	
17:15	7		4				11	
17:30	8		1				9	
17:45	3	22	3	13			6	35
18:00	6		5				11	
18:15	2		0				2	
18:30	6		1				7	
18:45	4	18	5	11			9	29
19:00	3		1				4	
19:15	3		3				6	
19:30	0		1				1	
19:45	5	11	1	6			6	17
20:00	1		1				2	
20:15	0		0				0	
20:30	2		0				2	
20:45	1	4	1	2			2	6
21:00	0		0				0	
21:15	0		1				1	
21:30	2		0				2	
21:45	1	3	0	1			1	4
22:00	2		0				2	
22:15	2		0				2	
22:30	1		0				1	
22:45	1	6	1	1			2	7
23:00	1		0				1	
23:15	1		1				2	
23:30	0		0				0	
23:45	0	2	0	1			0	3
TOTALS		166		250				**416**
SPLIT %		39.9%		60.1%				**43.7%**

DAILY TOTALS	NB	SB	EB	WB	Total
	530	423	0	0	953

AM Peak Hour	10:00	11:45			**10:00**	**PM Peak Hour**	12:00	12:00			**12:00**
AM Pk Volume	131	132			**206**	**PM Pk Volume**	30	140			**170**
Pk Hr Factor	0.744	0.508			**0.757**	**Pk Hr Factor**	0.938	0.538			**0.582**
7 - 9 Volume	127	34	0	0	**161**	**4 - 6 Volume**	41	23	0	0	**64**
7 - 9 Peak Hour	08:00	07:00			**08:00**	**4 - 6 Peak Hour**	16:45	16:30			**16:30**
7 - 9 Pk Volume	115	17	0	0	**132**	**4 - 6 Pk Volume**	22	16	0	0	**36**
Pk Hr Factor	0.719	0.708	0.000	0.000	**0.733**	**Pk Hr Factor**	0.688	0.800	0.000	0.000	**0.818**

APPENDIX B

Intersection LOS Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	4	1	113	5	172	0	0	69	108	0	0
Future Volume (vph)	0	4	1	113	5	172	0	0	69	108	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7		4.2	5.7				5.0	4.6	4.6	
Lane Util. Factor		0.95		1.00	0.95				1.00	0.95	0.95	
Frt		0.97		1.00	0.85				0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00				1.00	0.95	0.95	
Satd. Flow (prot)		3451		1770	3024				1583	1681	1681	
Flt Permitted		1.00		0.95	1.00				1.00	0.95	0.95	
Satd. Flow (perm)		3451		1770	3024				1583	1681	1681	
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	0	5	1	155	7	236	0	0	95	148	0	0
RTOR Reduction (vph)	0	1	0	0	141	0	0	0	84	0	0	0
Lane Group Flow (vph)	0	5	0	155	102	0	0	0	11	74	74	0
Turn Type	Prot	NA		Prot	NA				Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)		4.8		8.7	17.7				5.1	5.8	5.8	
Effective Green, g (s)		4.8		8.7	17.7				5.1	5.8	5.8	
Actuated g/C Ratio		0.11		0.20	0.40				0.12	0.13	0.13	
Clearance Time (s)		5.7		4.2	5.7				5.0	4.6	4.6	
Vehicle Extension (s)		4.0		3.0	4.0				3.5	3.0	3.0	
Lane Grp Cap (vph)		377		350	1219				183	222	222	
v/s Ratio Prot		0.00		c0.09	c0.03					c0.04	0.04	
v/s Ratio Perm									c0.01			
v/c Ratio		0.01		0.44	0.08				0.06	0.33	0.33	
Uniform Delay, d1		17.4		15.5	8.1				17.3	17.3	17.3	
Progression Factor		1.00		1.00	1.00				1.00	1.00	1.00	
Incremental Delay, d2		0.0		0.9	0.0				0.2	0.9	0.9	
Delay (s)		17.5		16.4	8.1				17.4	18.2	18.2	
Level of Service		B		B	A				B	B	B	
Approach Delay (s)		17.5			11.3			17.4			18.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	43.9	Sum of lost time (s)	19.5
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	6	0	109	3	65	0	0	81	60	0	1
Future Volume (vph)	1	6	0	109	3	65	0	0	81	60	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.7		4.2	5.7				5.0	4.6	4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95				1.00	0.95	0.95	1.00
Frt	1.00	1.00		1.00	0.86				0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00				1.00	0.95	0.95	1.00
Satd. Flow (prot)	1770	3539		1770	3030				1583	1681	1681	1583
Flt Permitted	0.95	1.00		0.95	1.00				1.00	0.95	0.95	1.00
Satd. Flow (perm)	1770	3539		1770	3030				1583	1681	1681	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1	7	0	121	3	72	0	0	90	67	0	1
RTOR Reduction (vph)	0	0	0	0	56	0	0	0	82	0	0	1
Lane Group Flow (vph)	1	7	0	121	19	0	0	0	8	33	34	0
Turn Type	Prot	NA		Prot	NA				Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	0.7	0.9		9.0	9.2				3.4	3.3	3.3	3.3
Effective Green, g (s)	0.7	0.9		9.0	9.2				3.4	3.3	3.3	3.3
Actuated g/C Ratio	0.02	0.02		0.25	0.25				0.09	0.09	0.09	0.09
Clearance Time (s)	4.2	5.7		4.2	5.7				5.0	4.6	4.6	4.6
Vehicle Extension (s)	3.0	4.0		3.0	4.0				3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	34	88		441	772				149	153	153	144
v/s Ratio Prot	0.00	0.00		c0.07	c0.01					0.02	c0.02	
v/s Ratio Perm									c0.01			0.00
v/c Ratio	0.03	0.08		0.27	0.02				0.06	0.22	0.22	0.00
Uniform Delay, d1	17.4	17.2		10.9	10.1				14.9	15.2	15.2	14.9
Progression Factor	1.00	1.00		1.00	1.00				1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.5		0.3	0.0				0.2	0.7	0.7	0.0
Delay (s)	17.7	17.7		11.3	10.1				15.1	15.9	15.9	14.9
Level of Service	B	B		B	B				B	B	B	B
Approach Delay (s)		17.7			10.8			15.1			15.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	57	2	80	12	129	0	6	90	72	2	0
Future Volume (vph)	0	57	2	80	12	129	0	6	90	72	2	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7		4.2	5.7			5.0	5.0	4.6	4.6	
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00	0.95	0.95	
Frt		1.00		1.00	0.86			1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00			1.00	1.00	0.95	0.95	
Satd. Flow (prot)		3522		1770	3054			1863	1583	1681	1690	
Flt Permitted		1.00		0.95	1.00			1.00	1.00	0.95	0.95	
Satd. Flow (perm)		3522		1770	3054			1863	1583	1681	1690	
Peak-hour factor, PHF	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Adj. Flow (vph)	0	89	3	125	19	202	0	9	141	112	3	0
RTOR Reduction (vph)	0	2	0	0	123	0	0	0	124	0	0	0
Lane Group Flow (vph)	0	90	0	125	98	0	0	9	17	58	58	0
Turn Type	Prot	NA		Prot	NA			NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)		5.6		6.7	16.5			5.2	5.2	5.4	5.4	
Effective Green, g (s)		5.6		6.7	16.5			5.2	5.2	5.4	5.4	
Actuated g/C Ratio		0.13		0.16	0.39			0.12	0.12	0.13	0.13	
Clearance Time (s)		5.7		4.2	5.7			5.0	5.0	4.6	4.6	
Vehicle Extension (s)		4.0		3.0	4.0			3.5	3.5	3.0	3.0	
Lane Grp Cap (vph)		465		279	1188			228	194	214	215	
v/s Ratio Prot		c0.03		c0.07	0.03			0.00		c0.03	0.03	
v/s Ratio Perm									c0.01			
v/c Ratio		0.19		0.45	0.08			0.04	0.09	0.27	0.27	
Uniform Delay, d1		16.4		16.2	8.2			16.4	16.5	16.7	16.7	
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.3		1.1	0.0			0.1	0.2	0.7	0.7	
Delay (s)		16.7		17.3	8.2			16.5	16.7	17.4	17.4	
Level of Service		B		B	A			B	B	B	B	
Approach Delay (s)		16.7			11.5			16.7			17.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	42.4	Sum of lost time (s)	19.5
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	4	1	122	5	175	0	0	69	110	0	0
Future Volume (vph)	0	4	1	122	5	175	0	0	69	110	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7		4.2	5.7				5.0	4.6	4.6	
Lane Util. Factor		0.95		1.00	0.95				1.00	0.95	0.95	
Frt		0.97		1.00	0.85				0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00				1.00	0.95	0.95	
Satd. Flow (prot)		3451		1770	3023				1583	1681	1681	
Flt Permitted		1.00		0.95	1.00				1.00	0.95	0.95	
Satd. Flow (perm)		3451		1770	3023				1583	1681	1681	
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	0	5	1	167	7	240	0	0	95	151	0	0
RTOR Reduction (vph)	0	1	0	0	143	0	0	0	84	0	0	0
Lane Group Flow (vph)	0	5	0	167	104	0	0	0	11	75	76	0
Turn Type	Prot	NA		Prot	NA				Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)		4.9		8.7	17.8				5.1	5.9	5.9	
Effective Green, g (s)		4.9		8.7	17.8				5.1	5.9	5.9	
Actuated g/C Ratio		0.11		0.20	0.40				0.12	0.13	0.13	
Clearance Time (s)		5.7		4.2	5.7				5.0	4.6	4.6	
Vehicle Extension (s)		4.0		3.0	4.0				3.5	3.0	3.0	
Lane Grp Cap (vph)		383		349	1220				183	224	224	
v/s Ratio Prot		0.00		c0.09	c0.03					0.04	c0.05	
v/s Ratio Perm									c0.01			
v/c Ratio		0.01		0.48	0.09				0.06	0.33	0.34	
Uniform Delay, d1		17.4		15.7	8.1				17.4	17.3	17.3	
Progression Factor		1.00		1.00	1.00				1.00	1.00	1.00	
Incremental Delay, d2		0.0		1.0	0.0				0.2	0.9	0.9	
Delay (s)		17.5		16.7	8.2				17.5	18.2	18.2	
Level of Service		B		B	A				B	B	B	
Approach Delay (s)		17.5			11.6			17.5			18.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	44.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	192	296	11	0	5
Future Volume (Veh/h)	0	192	296	11	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.73	0.73	0.92	0.92	0.92
Hourly flow rate (vph)	0	263	405	12	0	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		622				
pX, platoon unblocked						
vC, conflicting volume	417				542	208
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	417				542	208
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1138				470	797

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	132	132	270	147	5
Volume Left	0	0	0	0	0
Volume Right	0	0	0	12	5
cSH	1700	1700	1700	1700	797
Volume to Capacity	0.08	0.08	0.16	0.09	0.01
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	9.5
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.5
Approach LOS					A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	18.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	192	298	3	0	4
Future Volume (Veh/h)	0	192	298	3	0	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.73	0.73	0.92	0.92	0.92
Hourly flow rate (vph)	0	263	408	3	0	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		439				
pX, platoon unblocked						
vC, conflicting volume	411				541	206
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	411				541	206
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1144				471	801

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	132	132	272	139	4
Volume Left	0	0	0	0	0
Volume Right	0	0	0	3	4
cSH	1700	1700	1700	1700	801
Volume to Capacity	0.08	0.08	0.16	0.08	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	9.5
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.5
Approach LOS					A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	0	172	3	0	108
Future Volume (Veh/h)	2	0	172	3	0	108
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.73	0.92	0.92	0.73
Hourly flow rate (vph)	2	0	236	3	0	148
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			532			
pX, platoon unblocked						
vC, conflicting volume	386	238			239	
vC1, stage 1 conf vol	238					
vC2, stage 2 conf vol	148					
vCu, unblocked vol	386	238			239	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	742	801			1328	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	2	239	0	148
Volume Left	2	0	0	0
Volume Right	0	3	0	0
cSH	742	1700	1700	1700
Volume to Capacity	0.00	0.14	0.00	0.09
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	9.9	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.9	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	19.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	6	0	122	3	67	0	0	81	63	0	1
Future Volume (vph)	1	6	0	122	3	67	0	0	81	63	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.7		4.2	5.7				5.0	4.6	4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95				1.00	0.95	0.95	1.00
Frt	1.00	1.00		1.00	0.86				0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00				1.00	0.95	0.95	1.00
Satd. Flow (prot)	1770	3539		1770	3029				1583	1681	1681	1583
Flt Permitted	0.95	1.00		0.95	1.00				1.00	0.95	0.95	1.00
Satd. Flow (perm)	1770	3539		1770	3029				1583	1681	1681	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1	7	0	136	3	74	0	0	90	70	0	1
RTOR Reduction (vph)	0	0	0	0	57	0	0	0	82	0	0	1
Lane Group Flow (vph)	1	7	0	136	20	0	0	0	8	35	35	0
Turn Type	Prot	NA		Prot	NA				Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	0.7	0.9		9.2	9.4				3.4	3.3	3.3	3.3
Effective Green, g (s)	0.7	0.9		9.2	9.4				3.4	3.3	3.3	3.3
Actuated g/C Ratio	0.02	0.02		0.25	0.26				0.09	0.09	0.09	0.09
Clearance Time (s)	4.2	5.7		4.2	5.7				5.0	4.6	4.6	4.6
Vehicle Extension (s)	3.0	4.0		3.0	4.0				3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	34	87		448	784				148	152	152	143
v/s Ratio Prot	0.00	0.00		c0.08	c0.01					c0.02	0.02	
v/s Ratio Perm									c0.01			0.00
v/c Ratio	0.03	0.08		0.30	0.03				0.06	0.23	0.23	0.00
Uniform Delay, d1	17.5	17.3		11.0	10.0				15.0	15.3	15.3	15.0
Progression Factor	1.00	1.00		1.00	1.00				1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.5		0.4	0.0				0.2	0.8	0.8	0.0
Delay (s)	17.8	17.8		11.3	10.1				15.2	16.1	16.1	15.0
Level of Service	B	B		B	B				B	B	B	B
Approach Delay (s)		17.8			10.9			15.2			16.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	36.3	Sum of lost time (s)	19.5
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	163	181	7	0	8
Future Volume (Veh/h)	0	163	181	7	0	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.90	0.92
Hourly flow rate (vph)	0	181	201	8	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		622				
pX, platoon unblocked						
vC, conflicting volume	209				296	104
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	209				296	104
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1359				672	930

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	90	90	134	75	9
Volume Left	0	0	0	0	0
Volume Right	0	0	0	8	9
cSH	1700	1700	1700	1700	930
Volume to Capacity	0.05	0.05	0.08	0.04	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	8.9
Lane LOS					A
Approach Delay (s)	0.0		0.0		8.9
Approach LOS					A

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	163	187	2	0	5
Future Volume (Veh/h)	0	163	187	2	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.90	0.92
Hourly flow rate (vph)	0	181	208	2	0	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		439				
pX, platoon unblocked						
vC, conflicting volume	210				300	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	210				300	105
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1358				668	929

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	90	90	139	71	5
Volume Left	0	0	0	0	0
Volume Right	0	0	0	2	5
cSH	1700	1700	1700	1700	929
Volume to Capacity	0.05	0.05	0.08	0.04	0.01
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	8.9
Lane LOS					A
Approach Delay (s)	0.0		0.0		8.9
Approach LOS					A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	0	66	2	0	61
Future Volume (Veh/h)	3	0	66	2	0	61
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.90	0.90	0.92	0.92	0.90
Hourly flow rate (vph)	3	0	73	2	0	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			532			
pX, platoon unblocked						
vC, conflicting volume	142	74			75	
vC1, stage 1 conf vol	74					
vC2, stage 2 conf vol	68					
vCu, unblocked vol	142	74			75	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	896	988			1524	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	3	75	0	68
Volume Left	3	0	0	0
Volume Right	0	2	0	0
cSH	896	1700	1700	1700
Volume to Capacity	0.00	0.04	0.00	0.04
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	9.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.0	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	13.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	57	2	90	12	131	0	6	90	74	2	0
Future Volume (vph)	0	57	2	90	12	131	0	6	90	74	2	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7		4.2	5.7			5.0	5.0	4.6	4.6	
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00	0.95	0.95	
Frt		1.00		1.00	0.86			1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00			1.00	1.00	0.95	0.95	
Satd. Flow (prot)		3522		1770	3053			1863	1583	1681	1689	
Flt Permitted		1.00		0.95	1.00			1.00	1.00	0.95	0.95	
Satd. Flow (perm)		3522		1770	3053			1863	1583	1681	1689	
Peak-hour factor, PHF	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Adj. Flow (vph)	0	89	3	141	19	205	0	9	141	116	3	0
RTOR Reduction (vph)	0	2	0	0	124	0	0	0	124	0	0	0
Lane Group Flow (vph)	0	90	0	141	100	0	0	9	17	59	60	0
Turn Type	Prot	NA		Prot	NA			NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)		5.6		7.1	16.9			5.2	5.2	5.5	5.5	
Effective Green, g (s)		5.6		7.1	16.9			5.2	5.2	5.5	5.5	
Actuated g/C Ratio		0.13		0.17	0.39			0.12	0.12	0.13	0.13	
Clearance Time (s)		5.7		4.2	5.7			5.0	5.0	4.6	4.6	
Vehicle Extension (s)		4.0		3.0	4.0			3.5	3.5	3.0	3.0	
Lane Grp Cap (vph)		459		292	1202			225	191	215	216	
v/s Ratio Prot		c0.03		c0.08	0.03			0.00		0.04	c0.04	
v/s Ratio Perm									c0.01			
v/c Ratio		0.20		0.48	0.08			0.04	0.09	0.27	0.28	
Uniform Delay, d1		16.6		16.2	8.1			16.6	16.7	16.9	16.9	
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.3		1.3	0.0			0.1	0.2	0.7	0.7	
Delay (s)		16.9		17.5	8.2			16.7	17.0	17.6	17.6	
Level of Service		B		B	A			B	B	B	B	
Approach Delay (s)		16.9			11.8			17.0			17.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	42.9	Sum of lost time (s)	19.5
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	231	225	9	0	6
Future Volume (Veh/h)	0	231	225	9	0	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.64	0.64	0.92	0.92	0.92
Hourly flow rate (vph)	0	361	352	10	0	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		622				
pX, platoon unblocked						
vC, conflicting volume	362				538	181
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	362				538	181
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1193				474	831

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	180	180	235	127	7
Volume Left	0	0	0	0	0
Volume Right	0	0	0	10	7
cSH	1700	1700	1700	1700	831
Volume to Capacity	0.11	0.11	0.14	0.07	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	9.4
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.4
Approach LOS					A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	16.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	231	229	2	0	4
Future Volume (Veh/h)	0	231	229	2	0	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.64	0.64	0.92	0.92	0.92
Hourly flow rate (vph)	0	361	358	2	0	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		439				
pX, platoon unblocked						
vC, conflicting volume	360				540	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	360				540	180
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1195				472	832

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	180	180	239	121	4
Volume Left	0	0	0	0	0
Volume Right	0	0	0	2	4
cSH	1700	1700	1700	1700	832
Volume to Capacity	0.11	0.11	0.14	0.07	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	9.3
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.3
Approach LOS					A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	16.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	0	135	2	0	74
Future Volume (Veh/h)	2	0	135	2	0	74
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.64	0.92	0.92	0.64
Hourly flow rate (vph)	2	0	211	2	0	116
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			532			
pX, platoon unblocked						
vC, conflicting volume	328	212			213	
vC1, stage 1 conf vol	212					
vC2, stage 2 conf vol	116					
vCu, unblocked vol	328	212			213	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	773	828			1357	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	2	213	0	116
Volume Left	2	0	0	0
Volume Right	0	2	0	0
cSH	773	1700	1700	1700
Volume to Capacity	0.00	0.13	0.00	0.07
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	9.7	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.7	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	17.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	4	1	123	5	183	0	0	69	118	0	0
Future Volume (vph)	0	4	1	123	5	183	0	0	69	118	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7		4.2	5.7				5.0	4.6	4.6	
Lane Util. Factor		0.95		1.00	0.95				1.00	0.95	0.95	
Frt		0.97		1.00	0.85				0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00				1.00	0.95	0.95	
Satd. Flow (prot)		3451		1770	3023				1583	1681	1681	
Flt Permitted		1.00		0.95	1.00				1.00	0.95	0.95	
Satd. Flow (perm)		3451		1770	3023				1583	1681	1681	
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	0	5	1	168	7	251	0	0	95	162	0	0
RTOR Reduction (vph)	0	1	0	0	150	0	0	0	84	0	0	0
Lane Group Flow (vph)	0	5	0	168	108	0	0	0	11	81	81	0
Turn Type	Prot	NA		Prot	NA				Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)		5.0		8.7	17.9				5.1	6.0	6.0	
Effective Green, g (s)		5.0		8.7	17.9				5.1	6.0	6.0	
Actuated g/C Ratio		0.11		0.20	0.40				0.12	0.14	0.14	
Clearance Time (s)		5.7		4.2	5.7				5.0	4.6	4.6	
Vehicle Extension (s)		4.0		3.0	4.0				3.5	3.0	3.0	
Lane Grp Cap (vph)		389		347	1221				182	227	227	
v/s Ratio Prot		0.00		c0.09	c0.04					c0.05	0.05	
v/s Ratio Perm									c0.01			
v/c Ratio		0.01		0.48	0.09				0.06	0.36	0.36	
Uniform Delay, d1		17.5		15.8	8.2				17.5	17.4	17.4	
Progression Factor		1.00		1.00	1.00				1.00	1.00	1.00	
Incremental Delay, d2		0.0		1.1	0.0				0.2	1.0	1.0	
Delay (s)		17.5		16.9	8.2				17.6	18.4	18.4	
Level of Service		B		B	A				B	B	B	
Approach Delay (s)		17.5			11.6			17.6			18.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	19.5
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	201	303	18	0	8
Future Volume (Veh/h)	0	201	303	18	0	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.73	0.73	0.92	0.92	0.92
Hourly flow rate (vph)	0	275	415	20	0	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		622				
pX, platoon unblocked						
vC, conflicting volume	435				562	218
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	435				562	218
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1121				457	787

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	138	138	277	158	9
Volume Left	0	0	0	0	0
Volume Right	0	0	0	20	9
cSH	1700	1700	1700	1700	787
Volume to Capacity	0.08	0.08	0.16	0.09	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	9.6
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.6
Approach LOS					A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	201	310	2	0	2
Future Volume (Veh/h)	0	201	310	2	0	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.73	0.73	0.92	0.92	0.92
Hourly flow rate (vph)	0	275	425	2	0	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		439				
pX, platoon unblocked						
vC, conflicting volume	427				564	214
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	427				564	214
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1129				456	792

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	138	138	283	144	2
Volume Left	0	0	0	0	0
Volume Right	0	0	0	2	2
cSH	1700	1700	1700	1700	792
Volume to Capacity	0.08	0.08	0.17	0.08	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	9.6
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.6
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	18.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	0	172	11	0	108
Future Volume (Veh/h)	10	0	172	11	0	108
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.73	0.92	0.92	0.73
Hourly flow rate (vph)	11	0	236	12	0	148
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			532			
pX, platoon unblocked						
vC, conflicting volume	390	242			248	
vC1, stage 1 conf vol	242					
vC2, stage 2 conf vol	148					
vCu, unblocked vol	390	242			248	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	739	797			1318	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	11	248	0	148
Volume Left	11	0	0	0
Volume Right	0	12	0	0
cSH	739	1700	1700	1700
Volume to Capacity	0.01	0.15	0.00	0.09
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	9.9	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.9	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	19.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	6	0	125	3	72	0	0	81	75	0	1
Future Volume (vph)	1	6	0	125	3	72	0	0	81	75	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.7		4.2	5.7				5.0	4.6	4.6	4.6
Lane Util. Factor	1.00	0.95		1.00	0.95				1.00	0.95	0.95	1.00
Frt	1.00	1.00		1.00	0.86				0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00				1.00	0.95	0.95	1.00
Satd. Flow (prot)	1770	3539		1770	3028				1583	1681	1681	1583
Flt Permitted	0.95	1.00		0.95	1.00				1.00	0.95	0.95	1.00
Satd. Flow (perm)	1770	3539		1770	3028				1583	1681	1681	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1	7	0	139	3	80	0	0	90	83	0	1
RTOR Reduction (vph)	0	0	0	0	61	0	0	0	82	0	0	1
Lane Group Flow (vph)	1	7	0	139	22	0	0	0	8	41	42	0
Turn Type	Prot	NA		Prot	NA				Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	0.7	0.9		9.3	9.5				3.3	3.4	3.4	3.4
Effective Green, g (s)	0.7	0.9		9.3	9.5				3.3	3.4	3.4	3.4
Actuated g/C Ratio	0.02	0.02		0.26	0.26				0.09	0.09	0.09	0.09
Clearance Time (s)	4.2	5.7		4.2	5.7				5.0	4.6	4.6	4.6
Vehicle Extension (s)	3.0	4.0		3.0	4.0				3.5	3.0	3.0	3.0
Lane Grp Cap (vph)	34	87		452	790				143	157	157	147
v/s Ratio Prot	0.00	0.00		c0.08	c0.01					0.02	c0.02	
v/s Ratio Perm									c0.01			0.00
v/c Ratio	0.03	0.08		0.31	0.03				0.06	0.26	0.27	0.00
Uniform Delay, d1	17.5	17.3		10.9	10.0				15.1	15.3	15.3	15.0
Progression Factor	1.00	1.00		1.00	1.00				1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.5		0.4	0.0				0.2	0.9	0.9	0.0
Delay (s)	17.9	17.9		11.3	10.0				15.3	16.2	16.3	15.0
Level of Service	B	B		B	B				B	B	B	B
Approach Delay (s)		17.9			10.8			15.3			16.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	36.4	Sum of lost time (s)	19.5
Intersection Capacity Utilization	25.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	178	185	12	0	13
Future Volume (Veh/h)	0	178	185	12	0	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.90	0.92
Hourly flow rate (vph)	0	198	206	13	0	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		622				
pX, platoon unblocked						
vC, conflicting volume	219				312	110
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	219				312	110
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	1348				656	923

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	99	99	137	82	14
Volume Left	0	0	0	0	0
Volume Right	0	0	0	13	14
cSH	1700	1700	1700	1700	923
Volume to Capacity	0.06	0.06	0.08	0.05	0.02
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	9.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.0
Approach LOS					A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	15.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	178	197	1	0	3
Future Volume (Veh/h)	0	178	197	1	0	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.90	0.92
Hourly flow rate (vph)	0	198	219	1	0	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		439				
pX, platoon unblocked						
vC, conflicting volume	220				318	110
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	220				318	110
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1346				650	922

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	99	99	146	74	3
Volume Left	0	0	0	0	0
Volume Right	0	0	0	1	3
cSH	1700	1700	1700	1700	922
Volume to Capacity	0.06	0.06	0.09	0.04	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	8.9
Lane LOS					A
Approach Delay (s)	0.0		0.0		8.9
Approach LOS					A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	15.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	0	66	7	0	61
Future Volume (Veh/h)	15	0	66	7	0	61
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.90	0.90	0.92	0.92	0.90
Hourly flow rate (vph)	16	0	73	8	0	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			532			
pX, platoon unblocked						
vC, conflicting volume	145	77			81	
vC1, stage 1 conf vol	77					
vC2, stage 2 conf vol	68					
vCu, unblocked vol	145	77			81	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	894	984			1517	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	16	81	0	68
Volume Left	16	0	0	0
Volume Right	0	8	0	0
cSH	894	1700	1700	1700
Volume to Capacity	0.02	0.05	0.00	0.04
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	9.1	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.1	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	13.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	57	2	92	12	137	0	6	90	83	2	0
Future Volume (vph)	0	57	2	92	12	137	0	6	90	83	2	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7		4.2	5.7			5.0	5.0	4.6	4.6	
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00	0.95	0.95	
Frt		1.00		1.00	0.86			1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00			1.00	1.00	0.95	0.95	
Satd. Flow (prot)		3522		1770	3052			1863	1583	1681	1689	
Flt Permitted		1.00		0.95	1.00			1.00	1.00	0.95	0.95	
Satd. Flow (perm)		3522		1770	3052			1863	1583	1681	1689	
Peak-hour factor, PHF	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Adj. Flow (vph)	0	89	3	144	19	214	0	9	141	130	3	0
RTOR Reduction (vph)	0	2	0	0	122	0	0	0	119	0	0	0
Lane Group Flow (vph)	0	90	0	144	111	0	0	9	22	66	67	0
Turn Type	Prot	NA		Prot	NA			NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)		6.0		11.9	22.1			8.1	8.1	6.1	6.1	
Effective Green, g (s)		6.0		11.9	22.1			8.1	8.1	6.1	6.1	
Actuated g/C Ratio		0.12		0.23	0.43			0.16	0.16	0.12	0.12	
Clearance Time (s)		5.7		4.2	5.7			5.0	5.0	4.6	4.6	
Vehicle Extension (s)		4.0		3.0	4.0			3.5	3.5	3.0	3.0	
Lane Grp Cap (vph)		409		408	1307			292	248	198	199	
v/s Ratio Prot		c0.03		c0.08	0.04			0.00		0.04	c0.04	
v/s Ratio Perm									c0.01			
v/c Ratio		0.22		0.35	0.08			0.03	0.09	0.33	0.34	
Uniform Delay, d1		20.7		16.6	8.7			18.4	18.6	20.9	20.9	
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.4		0.5	0.0			0.1	0.2	1.0	1.0	
Delay (s)		21.1		17.2	8.8			18.5	18.8	21.9	21.9	
Level of Service		C		B	A			B	B	C	C	
Approach Delay (s)		21.1			12.0			18.8			21.9	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	19.5
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	242	231	14	0	10
Future Volume (Veh/h)	0	242	231	14	0	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.64	0.64	0.92	0.92	0.92
Hourly flow rate (vph)	0	378	361	15	0	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		622				
pX, platoon unblocked						
vC, conflicting volume	376				558	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	376				558	188
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	1179				460	822

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	189	189	241	135	11
Volume Left	0	0	0	0	0
Volume Right	0	0	0	15	11
cSH	1700	1700	1700	1700	822
Volume to Capacity	0.11	0.11	0.14	0.08	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	9.4
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.4
Approach LOS					A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	16.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	242	239	2	0	2
Future Volume (Veh/h)	0	242	239	2	0	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.64	0.64	0.92	0.92	0.92
Hourly flow rate (vph)	0	378	373	2	0	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		439				
pX, platoon unblocked						
vC, conflicting volume	375				563	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	375				563	188
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1180				456	823

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	189	189	249	126	2
Volume Left	0	0	0	0	0
Volume Right	0	0	0	2	2
cSH	1700	1700	1700	1700	823
Volume to Capacity	0.11	0.11	0.15	0.07	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	9.4
Lane LOS					A
Approach Delay (s)	0.0		0.0		9.4
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	16.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	0	135	8	0	74
Future Volume (Veh/h)	11	0	135	8	0	74
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.64	0.92	0.92	0.64
Hourly flow rate (vph)	12	0	211	9	0	116
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			532			
pX, platoon unblocked						
vC, conflicting volume	332	216			220	
vC1, stage 1 conf vol	216					
vC2, stage 2 conf vol	116					
vCu, unblocked vol	332	216			220	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	770	824			1349	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	12	220	0	116
Volume Left	12	0	0	0
Volume Right	0	9	0	0
cSH	770	1700	1700	1700
Volume to Capacity	0.02	0.13	0.00	0.07
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	9.7	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	9.7	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C

Queuing Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	4	1	113	5	172	0	0	69	108	0	0
Future Volume (vph)	0	4	1	113	5	172	0	0	69	108	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140		300	155		0	95		95	250		60
Storage Lanes	1		1	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		1149			439			495			532	
Travel Time (s)		17.4			6.7			13.5			14.5	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	6	0	155	243	0	0	0	95	74	74	0
v/c Ratio		0.01		0.30	0.21				0.10	0.22	0.22	
Control Delay		17.8		16.0	2.7				0.2	18.3	18.3	
Queue Delay		0.0		0.0	0.0				0.0	0.0	0.0	
Total Delay		17.8		16.0	2.7				0.2	18.3	18.3	
Queue Length 50th (ft)		0		26	0				0	14	14	
Queue Length 95th (ft)		4		70	8				0	44	44	
Internal Link Dist (ft)		1069			359			415			452	
Turn Bay Length (ft)				155					95	250		
Base Capacity (vph)		2948		1172	2997				1436	1382	1382	
Starvation Cap Reductn		0		0	0				0	0	0	
Spillback Cap Reductn		0		0	0				0	0	0	
Storage Cap Reductn		0		0	0				0	0	0	
Reduced v/c Ratio		0.00		0.13	0.08				0.07	0.05	0.05	

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	6	0	109	3	65	0	0	81	60	0	1
Future Volume (vph)	1	6	0	109	3	65	0	0	81	60	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140		300	155		0	95		95	250		60
Storage Lanes	1		1	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		1149			439			495			532	
Travel Time (s)		17.4			6.7			13.5			14.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	1	7	0	121	75	0	0	0	90	33	34	1
v/c Ratio	0.00	0.01		0.20	0.04				0.08	0.09	0.10	0.00
Control Delay	19.0	17.2		13.7	0.0				0.1	17.2	17.2	0.0
Queue Delay	0.0	0.0		0.0	0.0				0.0	0.0	0.0	0.0
Total Delay	19.0	17.2		13.7	0.0				0.1	17.2	17.2	0.0
Queue Length 50th (ft)	0	1		19	0				0	6	6	0
Queue Length 95th (ft)	4	5		70	0				0	29	30	0
Internal Link Dist (ft)		1069			359			415			452	
Turn Bay Length (ft)	140			155					95	250		60
Base Capacity (vph)	351	3212		1328	3030				1491	1447	1447	1379
Starvation Cap Reductn	0	0		0	0				0	0	0	0
Spillback Cap Reductn	0	0		0	0				0	0	0	0
Storage Cap Reductn	0	0		0	0				0	0	0	0
Reduced v/c Ratio	0.00	0.00		0.09	0.02				0.06	0.02	0.02	0.00

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	57	2	80	12	129	0	6	90	72	2	0
Future Volume (vph)	0	57	2	80	12	129	0	6	90	72	2	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140		300	155		0	95		95	250		60
Storage Lanes	1		1	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		1149			439			495			532	
Travel Time (s)		17.4			6.7			13.5			14.5	
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Shared Lane Traffic (%)										49%		
Lane Group Flow (vph)	0	92	0	125	221	0	0	9	141	58	58	0
v/c Ratio		0.10		0.26	0.13			0.02	0.28	0.15	0.15	
Control Delay		20.6		21.4	2.7			21.3	7.0	22.2	22.1	
Queue Delay		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay		20.6		21.4	2.7			21.3	7.0	22.2	22.1	
Queue Length 50th (ft)		12		33	1			2	0	16	16	
Queue Length 95th (ft)		23		56	6			10	15	34	34	
Internal Link Dist (ft)		1069			359			415			452	
Turn Bay Length (ft)				155					95	250		
Base Capacity (vph)		2665		959	2990			1295	1143	1158	1164	
Starvation Cap Reductn		0		0	0			0	0	0	0	
Spillback Cap Reductn		0		0	0			0	0	0	0	
Storage Cap Reductn		0		0	0			0	0	0	0	
Reduced v/c Ratio		0.03		0.13	0.07			0.01	0.12	0.05	0.05	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	4	1	123	5	183	0	0	69	118	0	0
Future Volume (vph)	0	4	1	123	5	183	0	0	69	118	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140		300	155		0	95		95	250		60
Storage Lanes	1		1	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		1149			439			495			532	
Travel Time (s)		17.4			6.7			13.5			14.5	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	0	6	0	168	258	0	0	0	95	81	81	0
v/c Ratio		0.01		0.32	0.22				0.10	0.23	0.23	
Control Delay		18.2		16.2	2.6				0.2	18.4	18.4	
Queue Delay		0.0		0.0	0.0				0.0	0.0	0.0	
Total Delay		18.2		16.2	2.6				0.2	18.4	18.4	
Queue Length 50th (ft)		0		29	0				0	16	16	
Queue Length 95th (ft)		4		76	8				0	47	47	
Internal Link Dist (ft)		1069			359			415			452	
Turn Bay Length (ft)				155					95	250		
Base Capacity (vph)		2928		1164	2987				1429	1373	1373	
Starvation Cap Reductn		0		0	0				0	0	0	
Spillback Cap Reductn		0		0	0				0	0	0	
Storage Cap Reductn		0		0	0				0	0	0	
Reduced v/c Ratio		0.00		0.14	0.09				0.07	0.06	0.06	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	6	0	125	3	72	0	0	81	75	0	1
Future Volume (vph)	1	6	0	125	3	72	0	0	81	75	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140		300	155		0	95		95	250		60
Storage Lanes	1		1	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		1149			439			495			532	
Travel Time (s)		17.4			6.7			13.5			14.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)										50%		
Lane Group Flow (vph)	1	7	0	139	83	0	0	0	90	41	42	1
v/c Ratio	0.00	0.01		0.23	0.05				0.08	0.11	0.11	0.00
Control Delay	19.0	17.7		13.9	0.1				0.1	17.2	17.2	0.0
Queue Delay	0.0	0.0		0.0	0.0				0.0	0.0	0.0	0.0
Total Delay	19.0	17.7		13.9	0.1				0.1	17.2	17.2	0.0
Queue Length 50th (ft)	0	1		22	0				0	8	8	0
Queue Length 95th (ft)	4	5		79	0				0	35	35	0
Internal Link Dist (ft)		1069			359			415			452	
Turn Bay Length (ft)	140			155					95	250		60
Base Capacity (vph)	355	3188		1320	3026				1484	1437	1437	1371
Starvation Cap Reductn	0	0		0	0				0	0	0	0
Spillback Cap Reductn	0	0		0	0				0	0	0	0
Storage Cap Reductn	0	0		0	0				0	0	0	0
Reduced v/c Ratio	0.00	0.00		0.11	0.03				0.06	0.03	0.03	0.00

Intersection Summary

Area Type: Other

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	57	2	92	12	137	0	6	90	83	2	0
Future Volume (vph)	0	57	2	92	12	137	0	6	90	83	2	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	140		300	155		0	95		95	250		60
Storage Lanes	1		1	1		0	0		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		1149			439			495			532	
Travel Time (s)		17.4			6.7			13.5			14.5	
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Shared Lane Traffic (%)										49%		
Lane Group Flow (vph)	0	92	0	144	233	0	0	9	141	66	67	0
v/c Ratio		0.15		0.34	0.17			0.03	0.38	0.24	0.24	
Control Delay		21.6		22.5	2.7			22.2	8.6	23.8	23.8	
Queue Delay		0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay		21.6		22.5	2.7			22.2	8.6	23.8	23.8	
Queue Length 50th (ft)		12		39	1			2	0	18	18	
Queue Length 95th (ft)		24		64	6			10	15	38	40	
Internal Link Dist (ft)		1069			359			415			452	
Turn Bay Length (ft)				155					95	250		
Base Capacity (vph)		2622		883	2964			1274	1128	1140	1145	
Starvation Cap Reductn		0		0	0			0	0	0	0	
Spillback Cap Reductn		0		0	0			0	0	0	0	
Storage Cap Reductn		0		0	0			0	0	0	0	
Reduced v/c Ratio		0.04		0.16	0.08			0.01	0.13	0.06	0.06	

Intersection Summary	
Area Type:	Other